LIGHT, AUGUST 18, 1938 FIRST AERO WEEKLY IN THE WORLD REGD. AT THE G.P.O. AS A NEWSPAPER

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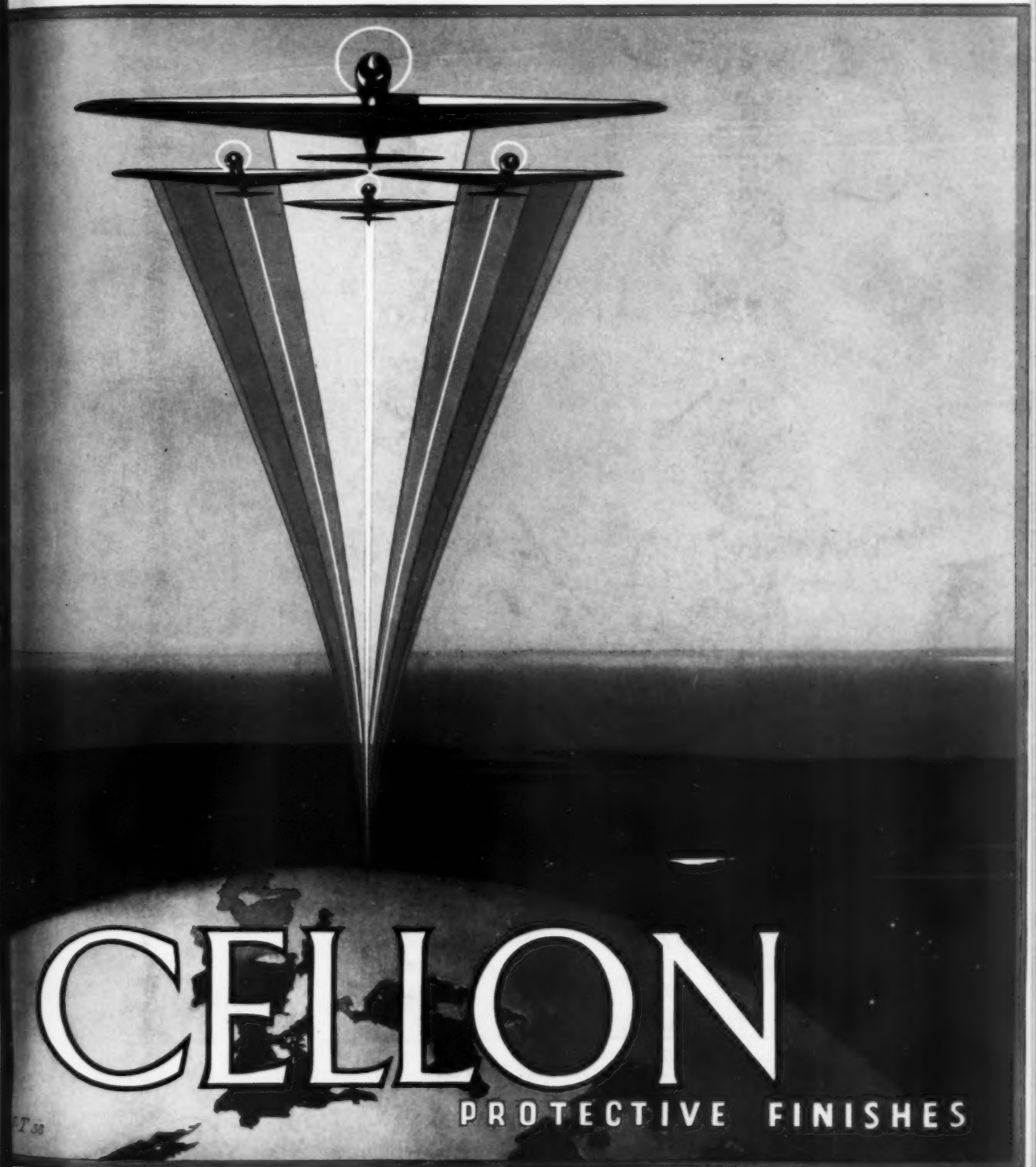

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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

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The Outlook

Manufacture in Canada

ONE of the drawbacks about a sudden expansion of a Service like the R.A.F. is that, when placing orders for aircraft and engines, the Air Ministry has had to select types immediately available, irrespective of whether they were likely to have a long period of utility in the Service, or whether they had been designed with a view to mass production. The very natural result was delays in delivery, and also the equipping of some of the squadrons with types which were really obsolescent.

No such consideration need hamper the selection of a type for production in Canada, once agreement on the main points has been reached between the Home and the Dominion Governments. The Air Ministry's policy has been outlined by Sir Hardman Lever, namely the placing of orders for one type. We understand that no decision has been reached as to what type will be ordered. Therefore the Air Ministry has a clean slate, and can set about this side of the expansion programme without having its hand forced by the need for urgent delivery.

A Four-Engined Bomber?

It is, on the face of it, mere common sense to assume that the type selected will be a long-range machine which will be able to fly the Atlantic when being delivered to the R.A.F. That suggests a heavy bomber. Our minds naturally turn to four-engined bombers, a class which is conspicuous by its absence from present R.A.F. standard landplane equipment. No one supposes that our designers have neglected that class, and it is permissible to presume that a prototype can be produced, tried out, and modified by the time that the Canadian industry is ready to commence manufacture. The type chosen ought to be so far in advance of existing types that it will be likely to have a long life, as a type, in the Service. It ought also to be designed on a system which will make its production in numbers by an industry which is not yet highly experienced in aircraft work a fairly simple and straightforward matter.

Simplicity of manufacture has not always been deeply studied in this country, because, before expansion came upon us, there was not much need for it. In the bad old days of unilateral disarmament it did not much matter if it took three or four years to re-equip the dozen or so of fighter squadrons with the latest thing in single-seater fighter. But now the subject has become very important, and lately it was announced that the Air Ministry is urging upon firms the desirability of close liaison between works managers and drawing office staffs. In addition to that, senior R.A.F. officers are now attached to aircraft works, to let the manufacturers know just how the R.A.F. pilots like things arranged. It should, therefore, be possible to lay before the Canadian industry a design which can be produced with ease and speed, and which should add very materially to the fighting strength of the R.A.F.

Berkeley Square

RUDYARD KIPLING once related how Tomlinson, having vacated his house in Berkeley Square, found considerable difficulty in securing other accommodation. The Air Ministry is, so to speak, reversing the process. Chronically in search of other accommodation, it has just secured a house in Berkeley Square. Gwydyr House, Victory House, Ariel House, and goodness knows how many more, recall house-hunting efforts not altogether unlike the flitting of Tomlinson's ghost between the gates of Heaven and Hell.

Yet even the move of all the productive directorates from the neighbourhood of Kingsway to Berkeley Square do not mean finality. The goal is a new glorious palace in Whitehall which shall be worthy of the Ministry upon which depends the first stage of Home defence and the expansion of high-speed transport. That scheme now reposes in some pigeon hole, awaiting, perhaps, the time when Government building schemes may relieve unemployment instead of embarrassing over-busy employers of labour. Yet even then there remains the uneasy feeling that Whitehall is a basket which the potential enemy bomber may find already temptingly full of eggs, and that it may not be the truest wisdom to cram it fuller than it is. The country might receive with something like equanimity the news that the House of Commons, and particularly the Chancellor of the Exchequer (whoever he might be), had fallen

to the bomb of a modern Guy Fawkes, but if the Air Ministry were to vanish in the holocaust, well, we might have to sue for peace straightaway. So there is something to be said for dispersing that Ministry about London.

Berlin = New York = Berlin

GERMAN aviation has scored a fine success with the two non-stop flights from Berlin to New York and New York to Berlin. Not only have both flights been of the nature of "records" for the distance, but what is significant is that the return flight was successfully undertaken almost at once, proving that the amount of engine and other overhaul needed to make the machine fit for a second attack on the 4,000 miles' distance was negligible. That is significant because but a very few years ago there was a general feeling about that Germany had not progressed quite so far with her engine manufacture as she had with aircraft. It was, in fact, said that the Hornet engines manufactured under licence by the B.M.W. firm were not up to the standards set by the original Pratt and Whitney engines. The double crossing of the Atlantic within a few days seems to prove that whatever may have been the position a few years ago, the German-built product is now as reliable as the American original.

The flights themselves, regarded purely as long-distance transoceanic crossings, were meritorious for the excellent navigation which at no time placed the machine more than a very few miles off its prescribed course, and Herren Henke, von Moreau, Dierberg and Kober are to be congratulated on a very fine piece of work. So far it is not clear to what extent they were helped by the British radio stations at Newfoundland and Foynes, if at all, but they were in touch with shipping and with Germany most of the time, so that in any event wireless has once more proved itself the handmaiden of long-distance flying. Without it such flights would have remained the hazardous undertakings they were in the days of the Atlantic flights of Alcock and Hawker. With it they become reasonably safe.

There is a tendency in some quarters to compare these German flights with the recent flight of *Mercury* to the disadvantage of the latter. That is rather misleading because although the German machine covered greater distances non-stop, it carried no pay load, whereas the British seaplane carried 1,000 lb. With engines of much lower power *Mercury* has a still-air range of 3,500 miles when carrying this pay load. If filled up with petrol it would have about the same range as *Brandenburg*.

Lessons from Spain

IT is a doubtful point whether the fighting in Spain can be taken as providing lessons which will be useful in future wars between European nations. The use of aircraft in various ways has, however, been carried out with fair thoroughness, and hints, at least, as to their effectiveness in various roles have been given.

In the August issue of the *Journal of the Royal United Service Institution*, a French officer, Capitaine Didier Poulain, who has been present with the Nationalist forces, has given some conclusions drawn from his own observations. His main points are: (1) That the bomber is practically defenceless against the single-seater fighter; (2) that anti-aircraft gunfire is surprisingly effective; (3) that incendiary bombs (small ones, at any rate) are a failure; and (4) that aircraft used as artillery for attacking positions are very efficacious. He also admitted the failure of aircraft to terrorise a civil population into evacuating a town, but qualified this by saying that Franco had never launched intensive bombardments against civil populations. Some of these conclusions deserved consideration.

One cannot deny the force of Capt. Paulain's contention that formation is now very little protection to bombers, because at modern speeds the deflection of bullets makes protective cross-fire really useless. Some of the other conclusions are rather surprising. Summed up, they go to indicate that the air arm as an independent weapon has not come up to expectations, but as a branch of the Army it is of very great importance. If that be accepted, it would seriously modify our ideas on the air menace to this country.

A Profit and Loss Account

IF fighters and guns, severally and in unison, have taken the measure of the bomber, then our air defence preparations have good hope of safeguarding our cities. Against this, we have always claimed that the main factor in our air defence is the counter-attack by our own bombers. If they, too, are mastered by the fighters and guns of the enemy, are we or are we not deprived of the major portion of our air defence?

The answer would seem to be this: The possibility of air invasion has reduced the safety of Great Britain. When there were no aeroplanes, the Royal Navy allowed the citizens to sleep soundly in their beds at night. Therefore, it must be to the advantage of Great Britain that aircraft as a striking force should be proved ineffective. We may make ourselves the strongest air power, but even so we shall be more vulnerable than if aircraft could be totally neutralised. As the whole is greater than its part, so we score by any indication that air defence is more effective than air attack. We may accept with equanimity the prospect of our own bombers failing to achieve their ambitions if we can, by means of our fighters and guns, substantially defeat the bomber force of the enemy.

If the fighting in Spain has proved the superiority of air defence, our minds are relieved to that extent; but Spain is not Great Britain, and circumstances (weather, for example) cannot be identical. Only the event can decisively answer the question, and we all hope that it will never be answered in that way.

Twin-engined Fighters

FOR a great many years the single-engined, single-seater fighter has held undisputed sway, not only in this country but in the majority of others. Signs are not lacking that show a tendency if not to supplant the single-engined at least to supplement it with twin-engined types, manned by more than the pilot.

The obvious "next step" is to think in terms of the twin-engined machine rendered familiar by a long series of bombers, light and heavy, with the engines on the leading edge of the wings. A French designer, M. Albert, suggests that better results might be obtained by placing the engines in tandem, and to make possible the use of a fixed rear gun he divides the tail of the aircraft into two complete units, each carried on a very slender fuselage. This leaves a gap through which the rear gun can fire. The idea has its points.

Wind-tunnel tests would probably be necessary before one could say definitely which would have the lower drag, the orthodox twin-engined type or the tandem-engined twin-tail. The latter would appear to be immediately possible for engines arranged for *canon*, without any "faking," but how effective use could be made of a fixed rear gun, sighted by the machine "turning tail" on its opponent, is a matter for discussion.

Forthcoming Events

August 20. Eastbourne Flying Club: Garden Party and Opening of New Club-house.
August 27-28. Southend Flying Club: Flying Meeting and Race.
September 3-5. U.S. National Air Races, Cleveland.
September 10. Cardiff Aeroplane Club: London-Cardiff Race.
September 11. Gordon Bennett Balloon Race, Belgium.
September 11-18. Swedish Civil Aviation Week.
September 19. Opening of West Hartlepool Airport by Secretary of State for Air.
September 21. Aero Golfing Society: Cellon Trophy, Richmond Golf Club.
November 18-December 4. Paris Aero Show, with Air Transport Congress.

"Flight" photograph.

FIGHTER CAMOUFLAGE. The Supermarine Spitfire (Rolls-Royce Merlin engine) is quite difficult to see against the ground. Now being produced in quantities for the R.A.F., the Spitfire has also been ordered from Lord Nuffield, who is to build it in his new Birmingham factory.

When Is It Bad Weather?

THERE seems to be a good deal of dissatisfaction, at Croydon in particular, about the way in which the controlled zone is enforced—or not, as the case may be. On one or two occasions recently, when the visibility has been fairly poor and the height of a few of the lower cloud masses has been at 500ft. or less, QBI has not been in action, while at other times, with a comparatively low cloud base, say, 800ft., but with unlimited visibility, the fatal letters have appeared on the tower and in the main hall.

Obviously the minimum figures laid down by international arrangements must, as far as possible, be adhered to, otherwise it would not be possible to control regular air services. But the controlled zone system was designed simply and solely to secure safety, and in matters of this kind the letter of the law is entirely unappreciative. Whether the conditions are safe for the passage of uncontrolled and radio-less aeroplanes amidst the regular transport machines is entirely a matter of experience. Only the control officer who has had this experience as a transport pilot can possibly say whether conditions are fit or otherwise.

It would be unfair and unkind to find fault with the control officers in general, probably 80 per cent. of whom are in every way capable, but while the institution of the controlled zone is to some extent a matter of personal preference in a control tower, the persons exercising this preference should be fully experienced.

By way of postscript one may reasonably ask whether the Air Ministry can always expect to obtain the services of the best possible staff when the control officers' salaries are so absurdly low.

The "Bottle Neck"

AFTER the first flush of enthusiasm over the Civil Air Guard Scheme has died down, those concerned with working out the details are gradually discovering the aspects which are likely to form the "bottle neck," and are seeking ways and means of surmounting the difficulties. As *Flight* has pointed out more than once since the C.A.G. scheme was first announced, there are really three likely sources of delay, two of which can be classed as production problems while the third is financial. Insurance is likely to prove a stumbling block to many would-be C.A.G. pilots. There seems to be little that the Government or the aircraft industry can do about it, and the matter will have to sort itself out, governed by natural financial conditions.

Of the two "production" problems, that which concerns the supply of machines may safely be left to the British aircraft industry. Other considerations will in any case preclude a real start being made until next spring.

There remains the very important problem of instructors. Already there is difficulty in securing the requisite number of qualified instructors for the R.A.F. training centres, and obviously these must be given precedence. One is thus forced to the conclusion that, however much it may be regretted, it will become necessary to lower the standard in the case of the Civil Air Guard Scheme.

Certainly no one would willingly adopt a measure which might detract in the slightest degree from the reputation which British flying tuition has established, but if relaxation there must be, it is obviously better that it should be applied to the less important than to the more important sphere of flying. And when it comes to a choice between those training for service in the R.A.F. and civilians learning to fly for their "A" licence, there can be no doubt.

"Flight" photograph.

Three-Fifty-Five (Amsterdam time): The Lockheed 14 ready to load up for the Liverpool run. The signboard on the right tells both passengers and public all about it.

Some Impressions of the LOCKHEED FOURTEEN

Flying with K.L.M. on the North Sea Service : More Essential Duplication

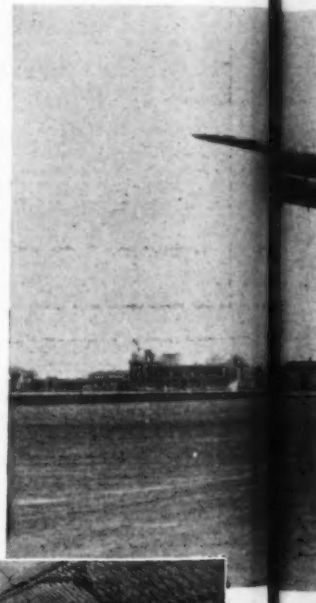
VERY shortly after K.L.M. started this season's operations across the North Sea from Amsterdam to Doncaster, Manchester and Liverpool, the first of the company's Lockheed Fourteens was, without fuss or flourish, put on this run. No doubt the machine—which, in its own particular way, is the most efficient transport aeroplane at present in service—is duly appreciated at the three airports concerned, but as far as I know no Fourteen has yet been seen at Croydon, which, for better or worse, is this country's Number One terminal airport.

It was, therefore, necessary to fly comfortably to Amsterdam in a D.C.3 and then across again to Liverpool in order to obtain some impression of this still rather new and, certainly, remarkable aeroplane. In fact, with reasonable weather conditions, this is by far the most comfortable and amusing way of travelling from London to Liverpool, though the journey takes the better part of an interesting day. Amsterdam airport at Schiphol, in spite of the present slight depression there, which has followed the suggestion that it will presently become an aerodrome solely of military interest, is worth visiting at any time, if only to see how interested the ordinary members of the public can be in flying affairs generally. Every day hundreds of citizens either go out to Schiphol to have lunch and to watch the flying, or are actually taken in motor buses out to and around the airport buildings.

Nobody at Schiphol appears to know for certain whether the airport will, for strategic reasons, become a military centre, and the municipality, quite naturally, are very much against the idea after spending so much money and effort. K.L.M., however, would rather like a central aerodrome of their own, lying evenly between Rotterdam, Amsterdam and the Hague, so that their services would be more convenient for everybody.

That, however, is by the way. The interest in the Lockheed Fourteen is a special one because very shortly British Airways will be taking delivery of the first of its series of four and the R.A.F. has ordered quite a few. Whether or not there has been a great deal of collusion between the two companies, the Fourteens ordered and now in use by K.L.M. have many features in common with those which are shortly to be taken over by British Airways. For instance, the all-electric nature of Lockheeds in general is no longer apparent. Both the Fowler flaps and the undercarriage are operated hydraulically. The power units, too, are similarly non-standard—Wright Cyclone F.62s in each case. These engines give a maximium of 920 h.p. (at 2,300 r.p.m. and 40 in. of boost) for take-off.

For European use the standard cabin and cockpit layout of the Fourteen is unsatisfactory. In America the methods of radio navigation are primarily concerned with medium-wave beams; two-way R./T. is used only for obtaining incidental information and weather reports. Consequently, apart from a stewardess, a crew of two is all that is necessary, and these two are adequately segregated from alarmist passengers in their front compartment. Over here the more particular use of two-way wireless and of W./T. necessitates the employment of a radio-operator as a third member of the crew. In the K.L.M. Fourteens the operator



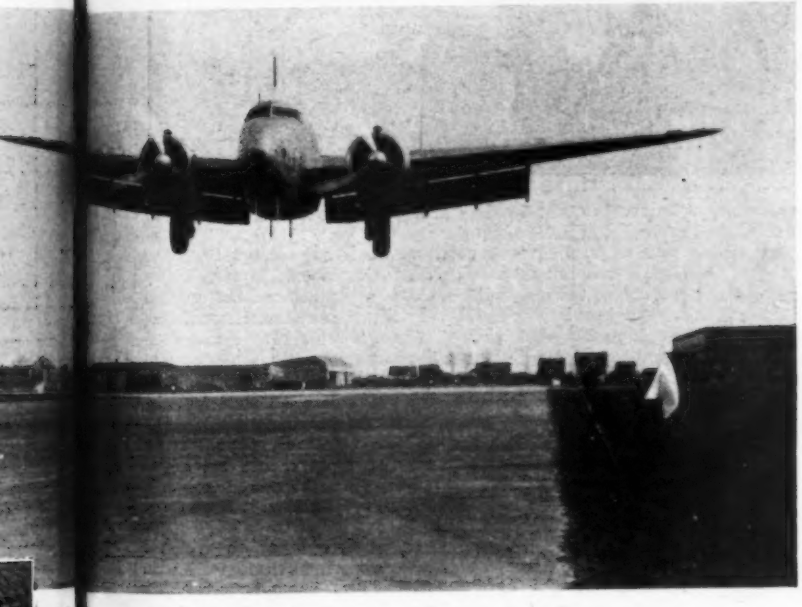
Inside the cabin of one of the K.L.M. Lockheeds. The radio operator is seated in front on the right; part of his equipment may be seen. British Airways' Fourteens will have a separate compartment for the operator. The passengers' seats are normally adjustable and may also be turned.

and his equipment are in full view of the passengers — an arrangement which is interesting enough, but inclined to be disturbing to inexperienced passengers when an approach is being made in bad weather conditions on a series of QDMs. British Airways machines will, like the Electras which they are now using, have a separate compartment for the operator and his equipment.

After all the rumours and criticisms which are customary pre-view features of any re-equipment plan, the Fourteen, from the passengers' point of view, comes as a pleasant surprise. It is much more roomy than one might expect, and almost, if not quite, as quiet as the D.C.3. Part of this quietness is due to the use of constant-speed airscrews (British Airways Fourteens will have full-feathering hydromatics) and part to the fact that in cruising trim the machine is normally flying on a comparatively small

"Flight" photograph.

Fifteen minutes at Doncaster: The Lockheed in front of the control building, on which the D. F. loop may be seen. When this photograph was taken the last was not being a great deal of use since the whole district was suffering from a series of violent thunderstorms.



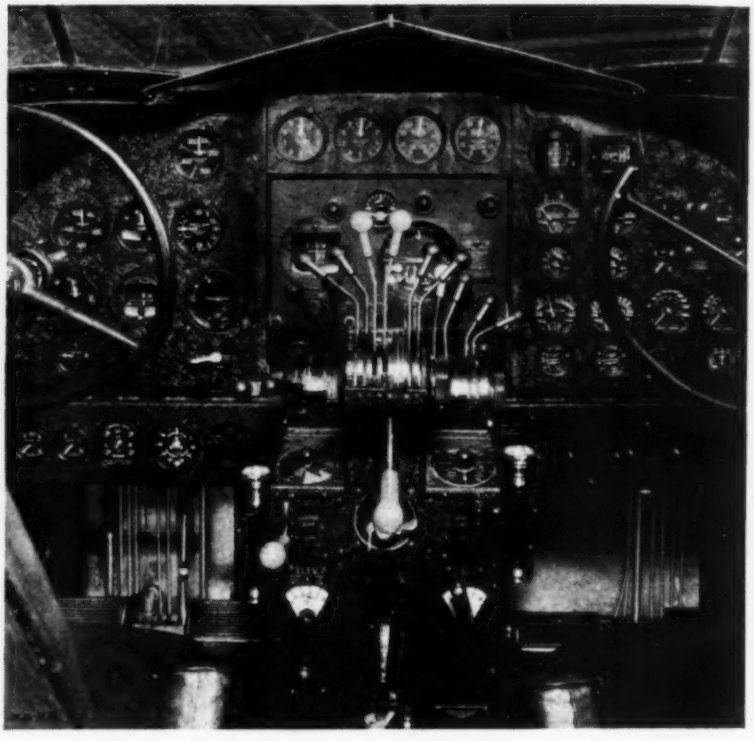
The photograph (left) of the Lockheed coming in to land on one of Schiphol's runways, which are now being further extended, gives a good idea of the area presented by the Fowler flaps. The cleanliness of the retractable undercarriage is noteworthy.

percentage of its maximum power. Naturally, because it is a smaller machine than those to which airline passengers are now becoming accustomed, it is a little more lively in rough weather, but there is no perceptible yawing or pitching motion in normal flight. The K.L.M. machines have Sperry automatic pilots and up in front a rhythmic pitching motion is discernible on the artificial horizons; this, however, cannot be felt by the passengers and seems to be due to a somewhat over-sensitive elevator control. This sensitivity can actually be felt during the non-automatic approach, but is otherwise perceived merely as an instrumental peculiarity.

On the Amsterdam-Liverpool run the Fourteen is working well within its capacities, since the schedule has been designed for the D.C.2, which is a very much slower machine. The Doncaster-Manchester section, for instance, is due to be covered in 25 minutes from tarmac to tarmac. The distance is about 50 miles, which gives an operational speed of 120 m.p.h., whereas the maximum cruising speed of the Lockheed, with F62 engines, is 230 m.p.h. Admittedly this figure is for flights at full operating height (14,000 ft.), but, nevertheless, the difference is considerable. Nowadays, lots of speed should be kept in reserve. The entire trip from Amsterdam to Liverpool is scheduled at the flying time of less than 2½ hours. Over the North Sea we were flying at a corrected air speed of less than 190 m.p.h. at 1,875 r.p.m. and 25in. of boost. Lots in hand there.

From the operator's point of view it is something of a nuisance to have the machine away from its base every night, but the whole idea of the service is to provide same-day connections with the rest of Europe in each direction, and, even if no change-over is made, the ground staff still have more than 2½ hours, while the machine is at Amsterdam, for carrying out routine inspection and test work.

After all that has been said and written about the Fowler flaps, these might reasonably be considered to be the most interesting technical feature of the Lockheed Fourteen. Certainly their expanse and range of movement are rather staggering to the newcomer. They slide back nearly four feet in their streamlined guides before continuing their movement in an angular plane to form what is virtually a second wing. Their effect on the approach angle and, presumably, on the landing speed is very pronounced. But, in spite of all the original claims, they cannot practicably be used to assist the take-off—at least, not with the Lockheed. While a 15- or 20-degree position undoubtedly shortens the take-off run considerably, the drag in this position, coupled with that of the unretracted undercarriage, is sufficiently great to remove altogether the possibility of staying up, least of all climbing, on a single engine. In the unlikely event of failure during the half-minute in which the undercarriage is still down, there would be little chance of completing an aerodrome circuit on full load. Consequently, the Fowler flaps, as take-off assisters, may justifiably be used only in small-field emergencies. The reserve of power, at least with the Cyclone engines, is such that no assistance is really needed. The acceleration is catapult-like and out of Schiphol, in a light breeze and with what appeared to be



Inside the control cabin of the Fourteen : The main control bank appears to be more complicated than it really is in practice. At its base, with appropriate indicators, can be seen the tab trimmer cranks for the elevators, rudder and ailerons, with the pull-type brake lever in the centre. Above are the engine, airscrew, heater, boost and automatic pilot controls. The flying instruments are on the left of the Sperry panel, and the temperature and fuel gauges on the right. At the top of the board will be seen the boost gauges (all-important nowadays) and the two-needle revolution indicators.

about half-load we were off and away in ten seconds. In the ordinary way of approach the Fowler flaps are lowered to the 60-degree position, the maximum angle only being used in conditions of no wind and when entering a small aerodrome. In this position the drag must be monumental.

Foiled, so to speak, in the matter of the flaps, there was still a very great deal of interest in the operational layout of the Fourteen. In no other machine yet in service has the principle of safety in duplication been carried to such an extreme. Nothing seems to have been forgotten. It would be impossible to describe all the different ways and means in which this "reserve" system has been incorporated, but a few examples will serve the purpose.

There are, of course, the usual hand-operated pumps for the flaps and the undercarriage in case the engine-driven pump fails. A further possibility has, however, been considered—that in which an over-zealous pilot might actually break the normal operating levers. In that case a reserve lever can be applied to the control system at another point. All the flying instruments are duplicated, but in addition a series of vacuum controls, on the starboard side of the dashboard, are provided so that in the event, for instance, of the breaking of the glass front of an artificial horizon, the "supply" of depression to this instrument can be cut off so that its partner directional gyro, worked from the same pipe-line, does not also remain inoperative. These controls may also be used for cutting out one or other of the two electrically heated pitot tubes and have distinct advantages in instrument maintenance work.

Fuel Reserve

Between the pilots' seats there is a box in which the dump valves are located. These valves are, for reasons of safety, designed so that once open they may not be closed, but when all the valves have been opened fuel still remains in the starboard rear tank so that there is sufficient for emergency purposes. The tank can be considered as the central point of the fuel system and is always used for take-off. In case of engine-driven pump failure there is a hand-pump which is immediately accessible and can therefore be used until such a time as the auxiliary system can be brought into action.

All the essential engine, hydraulic and trimming controls are mounted together on a central bank, those for the airscrews, throttles and mixture taking prior place, with the heater controls on the left and the automatic pilot, tail-wheel lock and boost controls on the right. On the front of the bank are the undercarriage, flap and emergency fuel-pump controls with three small cranks for trimming in the different axes. Needless to say, a mixture analyser is used, and the latest version of this Cambridge instrument appears to give very good results indeed. Certainly, from observation, the needles are much steadier than those of the original instruments.

An interesting instrument which is not often seen is the engine synchroniser. In this the needle is electrically coupled to the magnetos of the two engines and the engines are synchronised by moving the throttles until this needle has the slowest possible swing. Another interesting device consists of a wiring system in each crankcase which is so laid out that if any minor breakage occurs and the parts, or even some metal dust appear in the crank case, an electrical circuit causes a red light to show on the dashboard. The revolution indicators are of the two-needle type, giving hundreds and thousands on the scale rather after the manner of a sensitive altimeter. The flap indicator is a large dial on the left of the Sperry panel with degrees of depression clearly marked.

The K.L.M. Fourteens, or at least that in which I travelled, are fitted, by way of experiment and test, with Bendix wireless equipment. This, though beautifully made and no doubt excellent for use in America, is not really suitable for European conditions. The equipment includes a loop aerial, but this can only be used for homing purposes. The operator is provided with a stop-clock and a sensitive altimeter—two instruments which are essential for his work in modern conditions.

Nor is the Schiphol-Amsterdam run the easiest in the world from the navigational point of view. The Pennines in bad weather are not to be laughed at, and Barton, rather than Ringway, must, for the moment, be worked by the operator. In due course the latter's short-range station will be working. Doncaster has a short-range D/F station and Liverpool a medium-wave approach system which can be extremely useful—though another short-range D/F station at Speke would still be a help. The K.L.M. operator works on back bearings from Schiphol over the North Sea, and, if necessary, obtains a position (for E.T.A. purposes) from Pulham and Hull.

The Lockheed Fourteen is certainly the last word—in more ways than one. With the somewhat mixed navigational systems at present used—and static can still put the radio virtually out of action—its speed is probably as high as is practicable when the lower end of the range is considered. But as a technical achievement it is superb.

H. A. T.

OVER THE NORTH SEA in a SUNDERLAND

Some Impressions of a Patrol from Scotland to the Coast of Norway

By CAPTAIN NORMAN MACMILLAN, M.C., A.F.C.

Off the coast of Shetland. Off the east coast shoals of herring were seen, but no fishing fleet.

TWELVE flying-boats were riding quietly to moorings on the waters of the Cromarty Firth, off Invergordon. There, if you look at the map, you will see that the Firth widens into an almost completely land-locked bay of nearly circular shape; only a narrow channel leads outward to the sea. The enclosed basin is ideal for the use of flying-boats.

Five of the flying-boats were Londons, five were Stranraers, and two were Sunderlands. The high monoplane wing and deep distinctive hulls of the Sunderlands alongside the older pattern biplane flying-boats made the latter look like paddle-steamers lying alongside screw-driven ships.

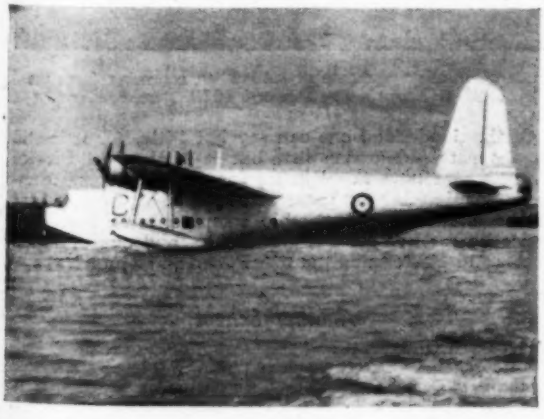
Darkness fell and the riding lights of the flying-boats made a twinkling pattern against the dark background of the sloping shore.

Just after 2 a.m. I was out on the jetty. Already the night air was full of the melody of throttled engines. Some of the flying-boats were under way, their navigating lights shining in the eerie glow from the north-eastern sky where a yellow ribbon of northern light stretched just above the hills.

Soon I was in the Power Boat tender with the officers of the boat in which I was to fly. The dark water foamed to white as we hydroplaned at speed over a glassy surface. Alongside, we entered the hull of a Sunderland, just as one enters the hull of an Empire boat.

The crew were asleep. A quick order and they sprang out of their comfortable-looking bunks and dressed. It was 2.43 a.m. The lights in the cabins shone bright.

Orders were to await reasonable daylight before taking off, for pilots and crews have not yet had long experience of the Sunderland and we were carrying a heavy load.



The Short Sunderland at moorings on the waters of the Cromarty Firth, off Invergordon.

At 3.22 the outer engines started and we were under way. Two minutes later the port inner engine fired, and half a minute afterwards the last of the four Pegasus engines was turning over.

We taxied towards the entrance channel, and turned near the buoys marking a ship that was wrecked there during the war. Ten minutes after the first engine started we had opened out for the take-off. We took a longish run over the glassy surface, but it was a smooth one—so smooth that it was difficult to detect exactly the instant when the hull and water parted company.

A few moments afterwards we turned in a big sweep to the left and headed away to the north-north-east. Soon the intermittent light of the lighthouse on Tarbat Ness winked to us with the Circe-like fascination of its breed when seen from the air. We were 1,500 feet up. Away to the left the Dornoch Firth was easily distinguishable from land, although the sun was not yet up.

Over the Hills of Sutherland

Above on our right hung the waning moon. We swept upward to 2,600ft. to clear the hills of Sutherland which rise to 2,000ft. They were brown hills, with a river valley running away on the left, and on the right, beyond a foreshore that reminded me of the Cornish cliffs, a silver and green sea. Far inland wild moorland and rough hills met the eye.

When the 2,313ft. high mountain of Morven passed under wing we were at 3,000ft. The tops of all the mountains were growing white beards—curious wisps of clouds that curled over their round slopes and twisted upwards.

About 4 a.m. cups of really hot coffee were served. And it was good! By that time a curtain of cloud had drawn down over the Orkney Islands and we began to climb above it. At 4,800ft. we cruised just level with the cloud peaks. Now one could appreciate our speed. We fairly charged over those rolling banks of white vapour.

At 4.16 a.m. the first kiss of the sun on the clouds was reflected as a thin detached line of horizontal light poised just above the main cloud layer. Around us grew one of the most beautiful settings I have ever seen. Overhead was the inverted vault of blue sky with its half-bitten moon still bravely shining; on the left the tones of the clouds and lower sky were the cold blues and white of the Arctic; ahead was alight with rose and saffron; and the right was flushed with the most delicate pink. Three minutes later the line of light in the sky broadened as cloud mountains just below it broke the level line of the horizon. Two minutes passed. Cloud hills shrouded the line of light, but in another minute it reappeared. We turned north and then back to east for the benefit of the navigator. At 4.26 a.m. a series of broad beads of light strung along the sky-

A long way from Land's End. "Across the Pentland Firth we spied John o' Groats."

line dead ahead dimmed the reflected line of light still shining above them.

Thirty seconds later, flying at 4,500ft., we saw the sun's upper rim come above the clouds. Simultaneously the beads vanished. The reluctant moon grew blue, then pale. Funny that that moon should die as I have seen men also die in the hours of dawn—blue then pale.

Four-thirty-two. I saw the sun's whole disc in burnished splendour. We flew on searching the clouds for a gap; went down to 4,000ft. The clouds looked thick. We climbed to 5,500ft. . . . 6,000ft., and scanned the horizon through powerful binoculars. There was no gap. One apparent break in the cloud layer was false; seen against the sun the curvature of the cloud surface frequently is deceptive. We had to descend, for our purpose was to search the surface of the sea for ships.

Below the Clouds

Here the R.A.F. Service craft differ from civil aeroplanes flying on regular air routes. The latter are organised for straight-line flight. Wireless is used to the maximum to aid the pilot, who can fly above the clouds in comfort until he nears his destination, when he can descend, still under radio guidance But the R.A.F. pilot flying the Sunderland could not fly above the clouds, for his work lay below them. There was no one below in the North Sea to tell him low the cloud base lay. The day before the clouds had mingled with fog to a bare 100 to 200 feet above the water. His course was not a continuous straight line. The weather below was our concern, and there was no one who could help us.

And so the senior pilot decided to descend and have a look. We could go down safely to a thousand feet or less above the sea, for we were now clear of land. The second pilot handled the air controls, the senior pilot handled the engines.

The hum of the engines changed as he throttled down. Flying straight we entered the clouds at 4,000ft. And how fast we seemed to enter them! Not a word was spoken as we met a few bumps while flying blind. Everyone gazed ahead. We lived a few moments of intense concentration. Then, at a thousand feet, the clouds parted and we saw the sea. We levelled out and opened up. Everyone on board was happy, for we could begin our search.

Soon I was asked to go down to breakfast. In the comfortable main cabin I sat with the "Captain" of the ship and ate hot bacon and eggs, rolls and coffee. An occasional drifter floated past on the grey surface down below, but none of the ships we sought, the ships of the British Navy. The clouds were broken; here and there rainstorms lashed the sea from a drooping curtain of mist.

We had just finished breakfast when we sighted the Norwegian coast. The broken hills and fjords north of Bergen mingled with the clouds and sea. It was the end of our patrol. We turned south, then west on to the new leg home at 6.15 a.m.

On over the placid sea we sped, now and then passing a drifter or a small diesel-engined cargo boat. At 6.50 a.m. the grey length of Shetland appeared out of the mist.

Five minutes later we saw the grey water ahead break into hundreds of round black patches. The nearest one might have been a submarine breaking surface. We looked more keenly, seized the binoculars. The black patches were herring shoals. Millions of fish were breaking surface. We flew over some of the shoals at 600ft., and in the threshing water we could see the silver bodies of the fish. The herring fleet lay more to the south and west, seemingly too far from the area where the fish were mostly shoaling. How obvious is the need for air co-operation with the fishing fleets, for we could see fish over an area of at least 100 square miles. At 7.35 a.m. we passed over Sumburgh Head, the most southerly point of Shetland.

Scapa Flow Underwing

Twenty minutes later we were over the broken islands of the Orkneys with their farms and small towns. Kirkwall and then Scapa Flow passed underwing, and as I looked down I thought that, in another war, the Battle Fleet would not shelter there securely as in the past, for we had travelled by an indirect route from within sight of the Norwegian coast in less than two hours. To-day Scapa Flow is not remote from Europe; from the air it looks an inviting bombing target.

Across the Pentland Firth we spied John o' Groats, then Wick with its aerodrome. Flying south over the sea I had time to admire the lovely cliff scenery. The black rocks threw dark shadows into the water; behind rose the mountains over which we had flown five hours before; in front of us lay the valley outflow towns of Helmsdale, Brora and Golspie; Dornoch lay farther east. On the south side of the Dornoch Firth we crossed over the bombing range of No. 8 A.T.S., and soon after its aerodrome of Evanton.

Soon we were sliding down towards the Cromarty Firth, where we glided in and touched water without a tremor at a speed of 90 knots. It was 8.50 a.m., and many of the good folks ashore were just thinking that the day was beginning and that the weather was going to be fine.

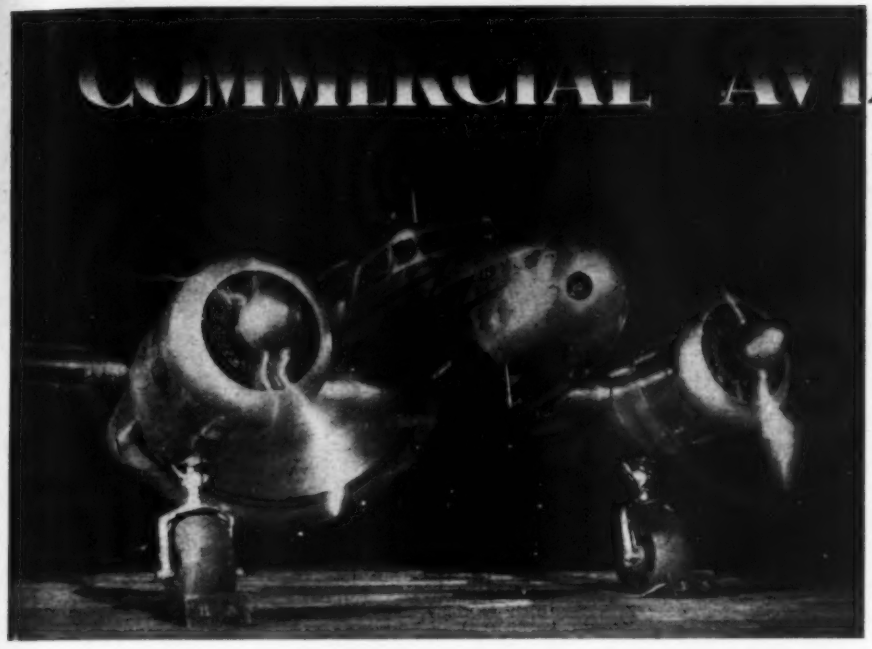
One of the first glimpses of land when returning from the coast of Norway was this one of No Ness, Shetland.

Of the Sunderland one can say but little, for it is still on the part publication list, but it is the best Service flying boat I have flown in for speed and all-round comfort. The interior compares with that of an Empire boat as the interior of a battleship compares with that of a cruise liner. But she's a grand ship, and one of which Shorts and Bristols and the R.A.F. can all be proud.

Another School

AIR SCHOOLS, LTD., whose London offices are at 4, New Court, Carey Street, London, W.C.2, will be starting work at the new Derby aerodrome at Burnaston on September 29. The school will be a "B" centre, which is to say that it will have 100 Volunteer Reservists in training. The managing director is Mr. Roy Harben, D.F.C., and Air Comdre. Fellowes will also be a director.

COMMERCIAL AVIATION



SEVEN-FIFTY FROM PARIS: An attractive photographic effect of floodlights on a British Airways Electra, which had just completed the last of the day's six journeys to and from Le Bourget. The company will very shortly be taking delivery of the first of its Lockheed 14s. Some impressions of this type are given in an article on pp. 138-140 in this issue.

THE WEEK AT CROYDON

"A. Viator's" Causerie on Airline Affairs at London's Main Terminal and Elsewhere

NO newspaper, much to my relief, has invented a mythical prohibited area in the North Sea, and better still has placed no ban on the Mediterranean during the past week, so that, but for a spot of QBI, we have had seven moderately peaceful days. There was a landing or so at Lympne last week owing to fog, and Colonel Lindbergh with wife and kiddie came in, bound for Croydon from his island home off the coast of Brittany. He did not, however, reach Croydon, but put down at Lympne, and then flew on to Reading.

We had our share of the floods last week, which came into the Croydon main hall and turned the tarmac into the exact replica of a lake in a way I have never seen before. There was a solid sheet of water all over the tarmac sufficiently deep for the wind to ruffle its surface and mobile refuelling units in some parts of the aerodrome moved majestically along, ankle deep, throwing up a substantial bow wave and followed by a respectable wake. I did not see any fish jump, but something in a bowler hat was seen to rise at a wasp—thought to be either Works or Bricks. These two worthies have not quite recovered, by the way, from the fact that when the torrent was at its height several of their drains, which are their pride and joy, reversed the processes of nature and threw up waterspouts instead of absorbing the surplus moisture.

The authorities refused to commit themselves, but suggested that someone in Australia might be pushing the stuff up.

One day last week coals were actually sent by air to Newcastle, at least coal dust samples and not exactly to Newcastle, but *via* Newcastle to Glasgow. The coal dust came by K.L.M.-C.L.S. line from Katowice, Poland, and continued by North Eastern Airways to the North.

Mr. Ivor Novello came in from Paris by Air France one day and, by the way, it is interesting to see how popular the Bloch type is becoming with the travelling public. It shows it is high time Imperial Airways, who have been so badly let down in the matter of delivery of landplanes, got some new, fast-flying stock. British Airways also have the speed on the Paris run, and their success is measured by the constant demand of their traffic staff for bigger seating capacity. Speed plus comfort is essential in these days.

An interesting sidelight on the all-round service a wideawake company gives its clients was observed last week. A passenger by K.L.M. from Amsterdam arrived the same time as the C.L.S. service from Prague, also looked after at Croydon by K.L.M. He saw some remarkably fine partridges being unloaded from the Czech machine and made enquiries from K.L.M. Import Freight. After consulting the London consignee, the company was able to introduce the enquirer to the importer.

We are coming all over "Secret Service" at Croydon and look upon one another furtively.

One of the firms has a mysterious and frightfully secret Government job on hand which every office boy shrilly tells his girl friends all about in detail, up and down our corridors. There is a corrugated iron barrier in one of the hangars where everyone used to roam around unchecked and a barbed wire entanglement on which employees of the firm (wild horses—no nor army mules—wouldn't drag the firm's name from my sealed lips) spend hours hooked up by their back pants, but which, nevertheless, purblind people on Purley Way can see through quite easily. The noses of the secret planes peer over the wire like so many hacks in loose boxes. There is a terrible fellow in dark blue uniform on guard, whose very presence attracts loiterers. Members of the firm have quite lost their candour and drink tea through straws these days, their lips being sealed.

COlumny

One of the Sunday newspaper columnists attacks internal air line flying, with some justification, it may seem. One company (and all the rest will get the blame) kept the columnist waiting (and you'd better keep an irritable minor Royalty waiting than a columnist, believe me) for forty minutes, whilst all hands gazed hopefully at the sky in search of a plane that had to connect up.

The point was that the connecting plane they were waiting for had been cancelled and they had not been told. Also nobody in uniform informed the passengers why there was a delay. Both these things are bad and perhaps the worst of the two is to delay a service and keep your passengers wondering what the trouble is. It costs nothing to give them the reason, explain the situation and see that they are comfortable whilst they wait, assured that you are doing your best, that you are really sorry about the delay and that you will inform them as soon as things are fixed up.

COMMERCIAL AVIATION (CONTINUED) : WORLD NEWS

Sydney-Saigon

IN co-operation with Air France, K.N.I.L.M. will start a new service on August 30 to connect Batavia with Saigon. With the new Intercontinental Airways (K.L.M.-K.N.I.L.M.) extension to Australia, this will mean that passengers between Sydney and French-Indo-China will be able to make the trip in two days.

The Atlantic Plans

ACCORDING to the provisional programme, Mercury was due to make her second Atlantic crossing during this week. This trip will not, after all, be made, and an alternative programme—possibly in the form of a demonstration Empire flight—is being planned in its place.

In the circumstances, and unless other changes are made in the arrangements, the next Atlantic crossing by a British machine will be by the first Albatross early next month. During September, also, the first of the high-payload Empire boats, *Cabot*, will make its first crossing.

More Lockheeds for Australia

MACROBERTSON-MILLER AVIATION, the company which holds the mail contract in Australia for the western coastal services, has placed an order for two Lockheed Electras. The MacRobertson-Miller fleet at present consists of five D.H. Dragons, a Cessna, a Fokker Universal and four Fox Moths.

Guinea Airways, too, have recently imported a Lockheed 14, the first to be seen in Australia. This machine will be put on the Adelaide-Darwin service, and is expected to cut down the schedule from two days to one. This particular Fourteen is fitted with Pratt and Whitney Hornets.

Educational

IT is an excellent practice nowadays of airline companies to produce pamphlets in which the work of air service operation and navigation in greater or lesser detail is described and illustrated for the benefit of their passengers.

One of the best of these has been produced by Deutsche Lufthansa, and in our issue of June 2 we mentioned some of the virtues and features of this as it appeared in its original German form. The booklet has now been published in English and describes everything from maintenance and inspection to blind approaches on the ultra-short-wave beam.

Preparation in Italy

THE extension of the Italian "air harbour" system is progressing rapidly. The airport at Bracciano, near Rome, laid out by the Ala Littoria for their own and Imperial Airways' services, has now been opened, and on the same day the station at Milan was put into service.

The Milan base is now the largest artificial lake in Europe, and, besides its aeronautical value, also serves as a pleasure beach and sports ground. A similar base at Rome will be ready in time for the World Exhibition of 1942. The two existing airports of Littorio (land) and Lido (water) will be joined for the purpose. The higher portion will be used for landplanes, while the lower portion, together with a large stretch of the adjoining Tiber valley, will be excavated and flooded to form an artificial lake. A single terminal block will serve both airports.

A Grim Week

ON the evening of August 10 a machine owned by M.A.L.E.R.T., the Hungarian operating company, crashed near Dbreczen, the twelve occupants, including a crew of three, losing their lives.

Four days later, on August 14, a C.L.S. Douglas on the Prague-Strasborg-Paris service struck a hill near Durbach, in the Black Forest. All seventeen occupants lost their lives, including the stewardess, who survived only for a few hours.

As far as we know, the Mexican machine, missing between Villahermosa and Puerto Mexico, with eleven on board, is still missing. The machine disappeared last Friday.

Meanwhile, the Accidents Department of the Air Ministry has issued a report on the loss of the Railway Air Services Rapide at Belfast on July 3. The machine spun into the ground from a height of about 600ft. and caught fire. The chief inspector has come to the conclusion that the accident was due to an error of judgment on the part of the pilot.

The Latest Kollsman

IN earlier models the barometric scale of the Kollsman sensitive altimeter has appeared on the lower side of the dial and is, in certain circumstances, rather difficult to read and to set. In the latest version this scale is arranged on the right of the dial and the numerals are placed alongside their corresponding graduations so that the setting can be read off at a glance. Furthermore, the scale in its new position is not likely to be obstructed by the pilot's hand when it is being adjusted by means of the setting knob at the base of the instrument.

Now that blind or semi-blind approaches are the order of the day the red reference pointers which are available will be appreciated. These pointers are quite separate from the operating mechanism, and are set by two knobs in the centre of the glass.

America's Civil Authority

IN last week's issue we gave brief details of the new Civil Aviation Authority in America. Since the names of those on the Board have been published there have been the usual complaints everywhere that "nobody has ever heard of them."

These names are Edward J. Noble (Chairman), Harlee Branch (Vice-Chairman), G. Grant Mason, Robert M. Hinkley, and Oswald Ryan. Mr. Noble is apparently a private flier, which is something. Mr. Branch is second assistant Postmaster-General, and Mr. Mason is the Havana manager for Pan-American Airways.

The Safety Board is made up of Lt.-Col. W. Sumpter-Smith, who is a wireless and airport expert, Mr. T. O. Hardin, who has been a transport pilot since 1927, and a third member who had not been appointed at the end of last month.

The most important of all, the Administrator, is Mr. Clinton M. Hester, who has done good work in the Government. Until he assisted in drafting the new Bill, however, he had had no aeronautical experience whatsoever.

The Old Order Changes

NOW that all first-class mail is carried in the ordinary way at flat rates both to Empire destinations and, when it can usefully be accelerated thereby, to all European countries other than those in the Iberian Peninsula, special air mail pillar boxes are no longer needed.

These blue boxes have been a familiar sight in London and in the larger provincial towns since 1930, and they will shortly disappear after serving their purpose in reminding the general public of air mail facilities.

During that first year, nearly a decade ago, air mail letters were being despatched from this country at the rate of about 40 tons per annum. By 1935 the figure had increased almost to 200 tons, and now that the all-up basis is practically universal the figure is approximately 2,000 tons a year. Even this figure will be increased shortly when certain air service extensions are made.

The total weight of all first-class mail from this country which can possibly be carried by air is 3,200 tons a year, of which rather more than 800 tons are for the American continent. In due course that 800 tons will presumably be included in the figures.

Extension at Heston

AT long last Heston airport is being extended at the western boundary—an action which has become particularly necessary since British Airways placed an order for Lockheed 14s.

The trouble in this case has been primarily concerned with the path behind the present boundary. This path has been a right of way for a very long time and is used by a large number of people every day. Apparently attempts were made to close it thirty-five years ago, but the local residents wrecked the barriers and afterwards won a Court case. This year they are again attempting to break down the fences which have been recently built, and a large number of watchmen have been engaged to patrol the area by day and night.

All of which is very sad indeed. The airport must be extended and the people must walk between Southall and Heston. Surely it should be possible to arrange another path round the new boundary which would involve an extra distance of not more than a few hundred yards for the residents.

The decision to close the path was taken by the local Borough Council in March, but the confirmatory order, to which there were no objections, was only granted at the Middlesex Quarter Sessions at the end of June.

TERMINAL : A K.L.M. Lockheed 14 Refuelling at the back of the shortly-to-be-completed airport building at Speke, Liverpool. For a long time the control tower stood alone in its glory ; the rest of the building now begins to give it true perspective.

"Flight" photograph.

Navigational Extension

THERE seems to be very little that Airwork of Heston will not tackle in the way of airframe and engine maintenance, charter work, sales and flying operations generally. As a matter of interest, it may be explained that both the machines and pilots employed by Martin Navigation—the work of which, in assistance of Manston, was described in last week's issue—are, so to speak, hired out by Airwork at a flat rate. In other words, the School is not concerned with, or responsible for, the flying part of the business, which certainly simplifies the organisation.

Solent Ferry Figures

AS might be expected, the number of passengers travelling on the Portsmouth, Southsea, and Isle of Wight service during the August Bank Holiday week was a somewhat phenomenal one, the figure being 5,348. All except 800 (who were joy-riders) flew on the regular Solent ferry service.

Incidentally, it seems that there is an increasing amount of luggage being carried on the Portsmouth-Ryde service, a fact which may appear uninteresting, but which suggests that more passengers are using this service as a means of transport rather than as an economical way of taking a pleasure flight.

Instrument Records

ON prolonged test flights it is obviously necessary that the readings of all the instruments, and even records of the position of the controls, should be made at regular intervals. Photography can be used for this purpose, but the difficulty, particularly at night time or in badly lit cockpits, is that of providing the necessary exposure.

After a good deal of experiment the Fairchild Aerial Camera Corporation have now started to produce a special test-flying camera which takes photographs both of the instruments and the controls at one-minute intervals. Infra-red is used for the illumination, and the instrument consists of three units—two camera and light assemblies, one of which incorporates the timing mechanism, and a control box. The cameras are intended to be suspended from brackets on the roof and rear wall of the cockpit, and the control box can be placed elsewhere in any convenient position.

Each of the cameras has its own built-in lamp, condensing lens and infra-red filter, and in one of the units the timing mechanism is arranged behind the lamp reflector to control the operations. Though the equipment has been designed to take pictures at minute intervals the frequency can be speeded up to one every five seconds. Signal lights on the control box indicate which of the two speeds is being used.

—That Was

FOR a long time the red and green Hornet Moth and Miles Hawk Major flown by the Shell representatives have been familiar to aerodrome visitors and flying meeting organisers. Usually they have been flown respectively by Messrs. Taylor and Bentley. Recently, Shell have bought a second Hornet Moth, which has been painted in the same colour scheme. For the benefit of those who require service, the registration letters are G-ADKE.

READY FOR WINTER

The B.T.R. De-Icer : Pulsating Equipment Available in this Country

DURING the past few years the majority of American transport aeroplanes have been fitted with the Goodrich type of pulsating de-icer, and those little troubles which were originally experienced with the equipment should by now have been overcome. This de-icer is now being manufactured over here by the British Tyre and Rubber Company, and the sales arrangements are being handled by Palmer Tyres. The Air Ministry has, we understand, placed a large order for this equipment.

The system used involves the fitting of rubber overshoes to the essential leading edges, these overshoes containing tubes which are capable of regular inflation and deflation. The surface of the overshoe consists of a thin sheet of vulcanised rubber which is treated during manufacture with a special oil mixture. In the case of large areas, such as those involved in the leading edge of the main plane, three tubes are generally used, and the inflation pulses are timed so that when the centre tube is inflated the other two are deflated, and *vice versa*, the pulsations continuing as long as the de-icer control is turned on by the pilot.

Fabric-covered steel reinforcing strips are used for attaching the whole assembly at its outer edges to the wing or fin, and the inner tubes are made of rubber and fabric, so that they have a limited stretch. When the tubes are deflated the overshoe lies flush with the wing section.

On control surfaces and radio masts a smaller unit, using only two tubes, is used, and a further variation designed for those parts with a sharp leading edge has a seam between the tubes which follows a sine curve, so that no dead areas are left.

A single Rotax pneumatic pump provides the necessary pressure on smaller machines, though two pumps are generally fitted to multi-engined types. These pumps are used at the same time to supply suction to operate the usual gyroscopic instruments, which are, nowadays, usually driven by pump in this way. In the de-icer pressure line there is an oil separator which not only removes the oil vapour from the pump exhaust, but also regulates the pressure in the tubes through a relief valve. This separator is also duplicated on larger machines. After leaving the separator the air passes to a rotating distributing valve which controls the inflation and deflation of the different tubes.

With a machine having a wing-spread of 85ft., the weight of the entire de-icer equipment is 108 lb. The operating pressure is 7 lb./sq. in. as a maximum, and the pulsations are arranged to occur at about 40-second intervals.

In the B.T.R. equipment for protecting airscrew blades a de-icing solution is fed to the affected surfaces by means of a slinger ring mounted behind the airscrew hub. Needless to say, the location of the supply tubes is important and varies with different airscrew designs. The equipment also includes a special oil-saturated rubber cover over the airscrew hub, so that no large masses of ice may form and consequently be flung off to damage the blades.

In order to provide a somewhat different form of protection for those parts which cannot conveniently be fitted with de-icers, an abrasion shoe may be supplied. This consists simply of moulded light-weight rubber which is applied directly to the existing surfaces. Apart from its ability to resist the action of snow and sleet, this shoe also protects the surfaces from stones and other material thrown up in the slipstream during the take-off.

With such equipment it is obviously necessary that the work of installation should be started while the machine concerned is still being constructed, since the de-icing equipment becomes part and parcel of the whole design.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

THE blue air mail post-boxes, the first of which was erected in 1930, are shortly to disappear, since air carriage of mails has become such a normal method. When the boxes were introduced about 40 tons of air mail left the country annually. The figure is now over 2,000 tons.

No fewer than five of the first six places in the examination held on May 31 for the entry of R.A.F. apprentices were taken by boys of the same school—Esplanade House School, Southsea. A total of 1,894 candidates passed the examination.

Within 24 hours of landing at Southampton from a transatlantic liner, Mr. Harold I. June, of the United Aircraft Corporation, America, set off by Imperial Airways for Durban, where he will carry out experimental radio work on behalf of South African Airways. Mr. June was chief pilot of Admiral Byrd's Antarctic Expedition.

The Air Ministry states that there has been no change in the arrangements for the supply of R.A.F. aircraft by the United States. Delivery will begin towards the end of the year. The machines, it will be remembered, are Lockheed 14s and North American trainers.

Alys Harrison McKey (Mrs. John Milton Bryant), who was the first woman to fly in Canada, last week celebrated the twenty-fifth anniversary of her first flight by issuing a special air mail letter, a copy of which has been received by *Flight*. The photograph enclosed shows Miss McKey with the Curtiss pusher which she flew in 1913.

Sir Kingsley Wood, Secretary of State for Air, who toured several stations during the Exercises, sees a fire-tender crew at Hornchurch, equipped with Bell asbestos suits and foam equipment.

At an air fête held at Louis-le-Saunier, France, "James Williams" was killed when his parachute failed to open soon enough after making a demonstration jump from 3,000ft. His real name was Nilaud, and it was as recent as last March that he captured the world's record for a delayed drop, with a jump from 35,433ft. He then fell to within 655ft. of the ground.

Plans for R.A.F. training in Canada are beginning to take shape, following the survey of the stations at Borden and Trenton, Ontario, by Group Capt. J. M. Robb, Commandant of the C.F.S. He is likely to extend his survey to the Maritime Provinces and Western Canada.

Twenty-five Years Ago

(From "Flight" of August 16, 1913.)

"On Monday in the House of Commons, Sir J. Rees asked the Secretary for War whether engines for airships, aeroplanes and waterplanes could be, and were being, constructed in this country; whether firms making such craft were in receipt of regular orders from the War Office . . . and whether, in time of war, aircraft or parts thereof could be imported into the United Kingdom."

Early last Sunday morning Gwynne Johns made a delayed drop from 18,000ft. in darkness over Netheravon. After 85 seconds he pulled his rip cord and descended in more leisurely style from 4,000ft. By arrangement, four aerodromes on Salisbury Plain were illuminated and watchers posted, but it was not until an hour after he had jumped that he was found.

Last Monday an unusual visitor arrived at Cardiff airport in the form of a D.L.H. Junkers Ju.52. It had been sent there from Germany to pick-up two invalids, one of whom, Herr J. Preiss, had lain in Swansea Hospital for nearly five weeks after an accident in the recent International Six Days' Trial for motor cycles. The other patient was a six-year-old girl, Dinah Frayne, who had been crippled after a motor accident.

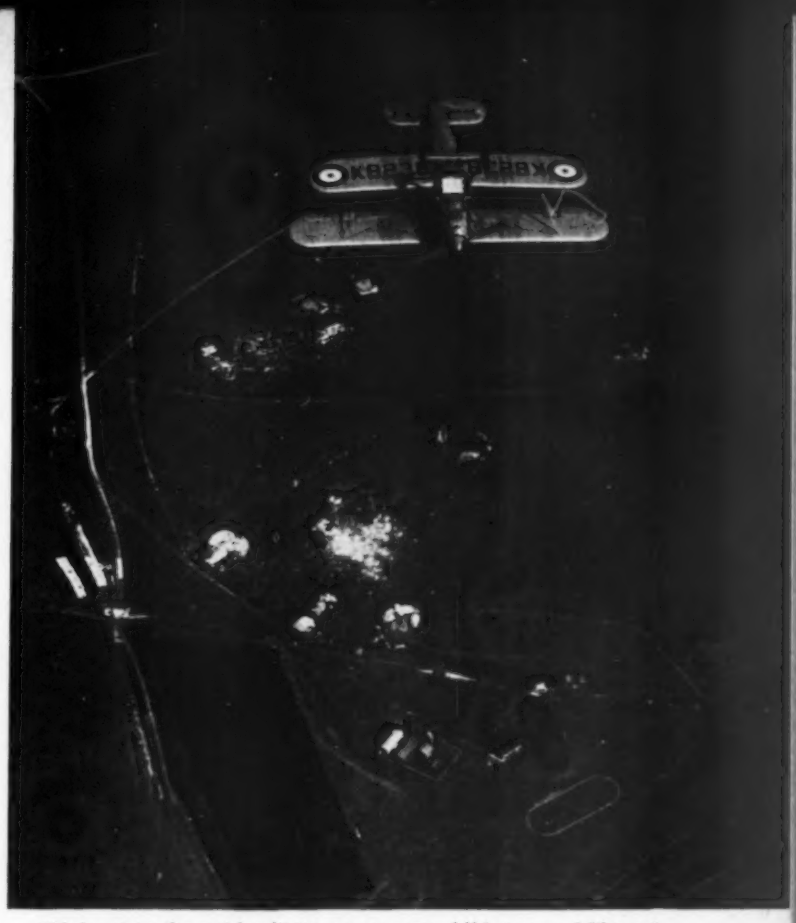
The navigator in a London of No. 201 Sqn. uses his camera from the forward gun position. The photograph was taken over Montrose from the second pilot's seat during the recent manœuvres. A new form of suiting having "built-in" silk harness and floatation equipment, including a small sparklet-type compressed air bottle is used by the Squadron.

R.A.F. Units Visited

The CENTRAL FLYING SCHOOL

By MAJOR F. A. de V. ROBERTSON, V.D

(Illustrated with "Flight" Photographs)



This is not (as the poet has it) "a woman scorned," but a very deliberately upset Fury, flown by a C.F.S. instructor. Past days at Hendon showed the almost uncanny skill of C.F.S. instructors in inverted aircraft.

ON the pages of *Flight* which deal with the affairs of the Royal Air Force there appear from time to time notifications that certain officers and sergeants have passed through the Central Flying School and have been placed in category A2, or B, or C. Sometimes, also, it is notified that some of them have been raised to a higher category, occasionally even to the exalted dignity of category A1. Such notifications are, or should be, read with awe by everyone connected with the flying Services, for there is no higher testimony to supreme excellence in flying ability than to be categorised as A1 by the C.F.S.

Yet a C.F.S. category means considerably more than great skill in handling a joystick. It means that a man is a qualified instructor, authorised to teach others how to fly. He must not only be able to do everything which can be done with an aeroplane, but he must have a profound knowledge of the why and the wherefore of everything; he must understand the difficulties which the flying pupil is likely to find in mastering his art, and must know how to guide him through these difficulties.

In the present year of grace there are more young men learning to fly in schools controlled by the Air Ministry than ever before, and so the subject of instruction and instructors now makes a very wide appeal. Lives depend on the quality of the instruction given, and so does the expansion of the Air Force with its reserves. Obviously, the time was ripe for *Flight* to pay another visit to the centre where R.A.F. flying training is controlled. Some years ago we visited the C.F.S. at Wittering, and the article written as a result of that visit is included in the *Flight* book, *Squadrons of the Royal Air Force*. The present Commanding Officer of the school, Group Capt. J. M. Robb, D.S.O., D.F.C., is, if we may say so, an old friend of *Flight*, and he cordially approved of our proposal to drop in on Upavon. In the Chief Flying Instructor we found another old friend, whose portrait in the group published at the end of this article will be recognised by many.

As everyone in the Service knows, and many people outside the Service do not know, the Central Flying School exists to train flying instructors. When they have passed through the course and been placed in one of the categories A2, B or C, they are sent as instructors to one of the Flying Training Schools. At the end of the C.F.S. course the highest category allotted is A2, which means a distinguished pass. Only after a subsequent test is an instructor raised to A1. On the other hand, those who are placed in category C have to be re-tested at the C.F.S. after six months, and either raised to a higher category or disqualified from instructing. The majority who pass out are placed in the B category.

The spiritual father of the C.F.S., Lt. Col. Smith-Barry, whose School of Special Flying at Gosport during the war was the foundation of modern training principles.

The C.F.S. is like a research establishment where all theories of instruction are studied and formulated, and where the practice of teaching is systematised. Its influence is spread over every sphere and place of training connected with the Royal Air Force, and the instruction in purely civil flying schools is based on C.F.S. theory and practice. The completeness of its system and the widespread nature of its influence mark a violent reaction from the haphazard methods of the War, when almost anybody who could fly was considered competent to teach others to fly. Fighter pilots being rested after months of active service, with their nerves all jangled, were often put on to teaching cadets as a sort of "cushy job." It was not always cushy for the cadets. It would be a grim and tragic business to try

A composite echelon stepped up, showing the types now used at the C.F.S. course: Anson, Oxford, Hart Trainer, Tutor and Fury.

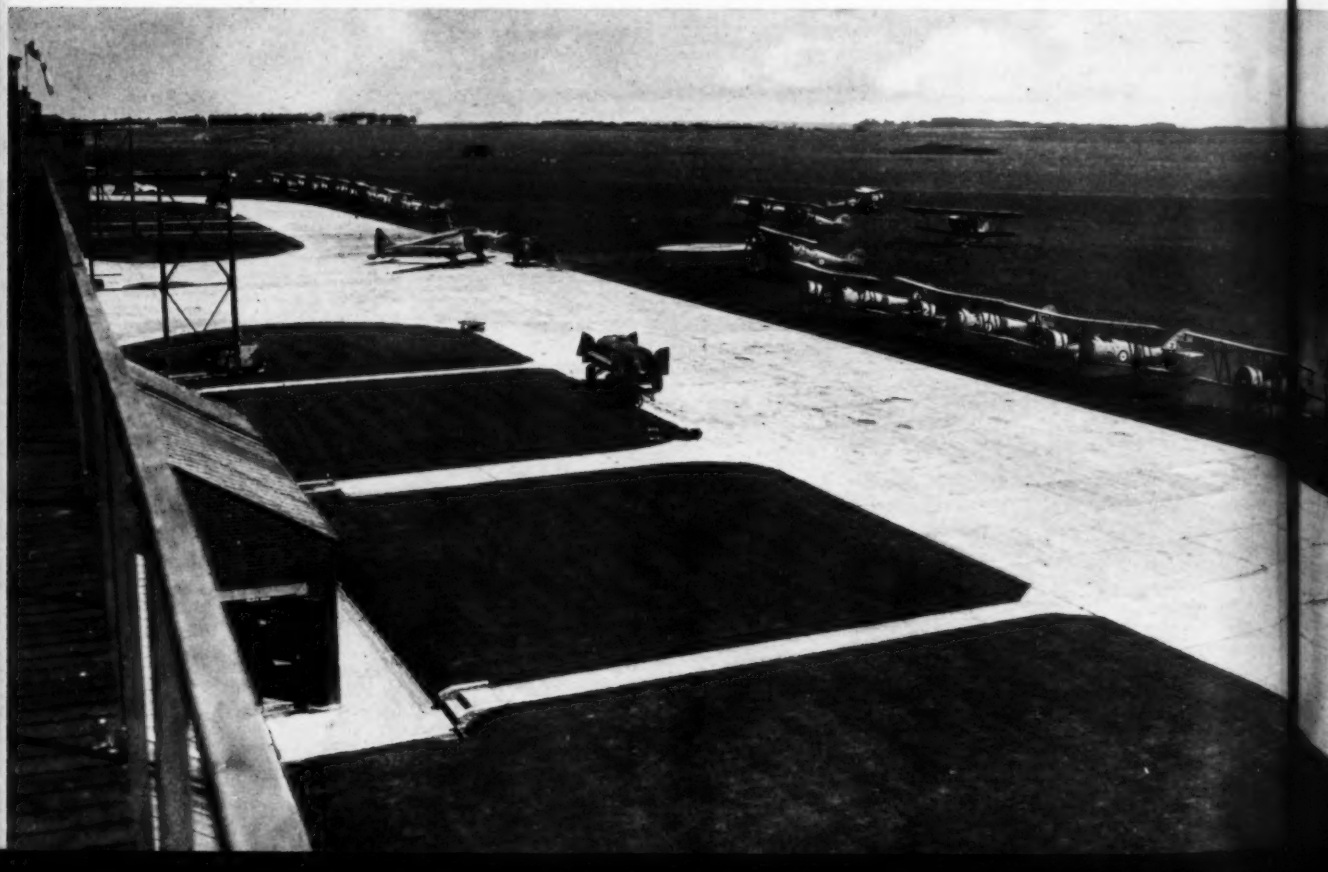
to calculate how many young lives were lost, with no profit to their country, as a direct result of allowing a man to instruct who had no qualifications for instructing.

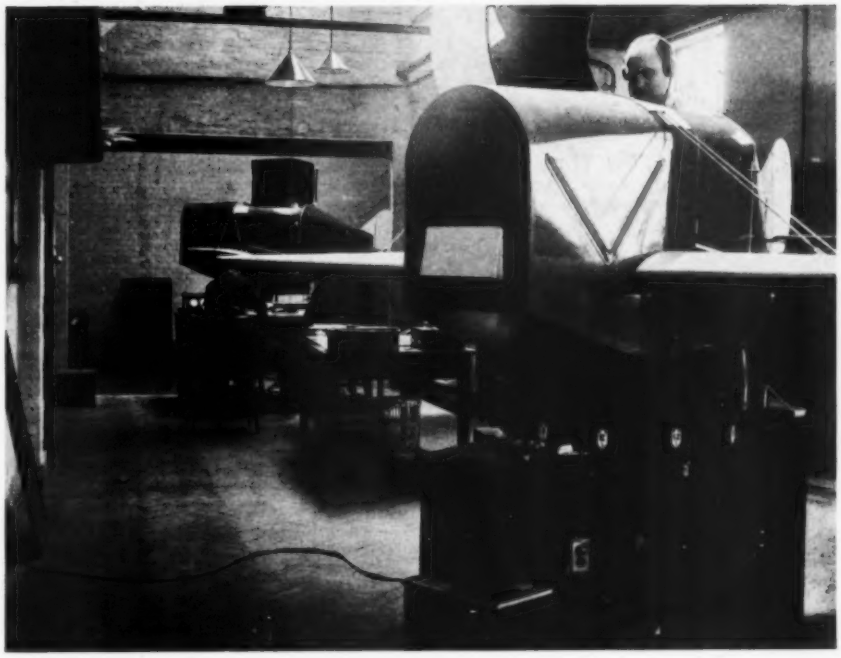
Then in 1917 there arose at Gosport the great Lt. Col. Smith-Barry, who first reduced flying instruction to an art and made for it a system. In almost every subject there are a few people who are born teachers, but most men and women have to be taught how to teach. Pedagogy is itself a science and an art. But in the case of flying there is more at stake than there is in teaching music or swimming or Latin grammar. So the country owes a deep debt to Col. Smith-Barry and the Gosport school, and the present Central Flying School carries on their good work.

The training of instructors has not always been the work of the C.F.S. The school was founded in August, 1912, at Upavon to teach military and naval flying to officers who had just learnt the elements of piloting from some civil instructor. It catered for both the naval and military wings of the newly formed Royal Flying Corps, and its first commandant was Capt. (afterwards Rear Admiral and Air Vice-Marshal Sir) Godfrey Paine. His assistant commandant was Major Hugh M. Trenchard, of the Royal Scots Fusiliers, whose subsequent career is well known to all the world. Later in the war the school at Upavon became the special school for teaching air fighting. By that time the Royal Naval Air Service had started its own schools for teaching its own pilots to fly. After the war the C.F.S. did a certain amount of elementary flying instruction, but presently settled down to the special work of training instructors for the R.A.F. Flying Training Schools, of which there are now ten in this country and one in Egypt.

In 1926 the C.F.S. moved from Upavon to Wittering, but since the expansion of the R.A.F. began it has been moved back to its original home at Upavon, on Salisbury Plain. A few miles off lies Netheravon, soon to be the home of No. 1 Flying Training School.

The way in which a man becomes an instructor qualified to teach pupils at a F.T.S. is as follows: Generally speaking, a pilot must have about a thousand flying hours to his credit before he will be considered for training as





Indoor activity at Upavon: Two Link Trainers in one room.

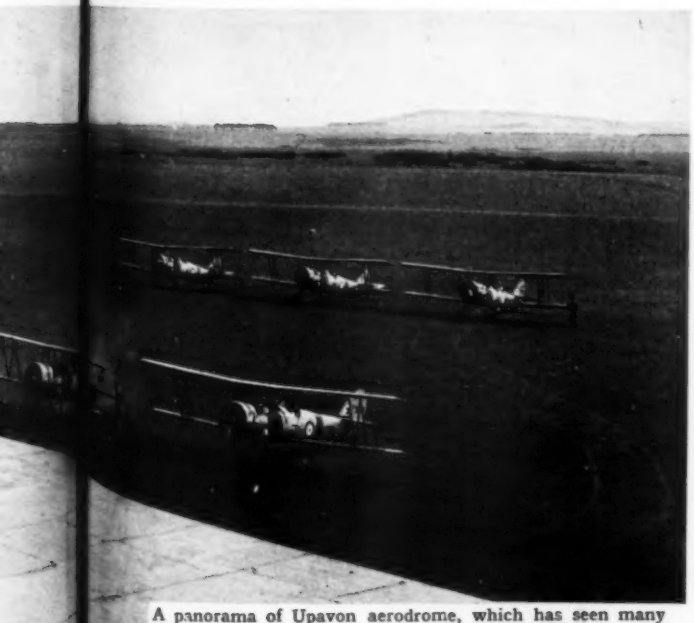
an instructor. Three times a year, in January, May and the middle of September, a batch of about forty goes to the C.F.S. Usually about a quarter of the number are sergeant pilots. It is also usual for a batch to include one or two foreign officers from countries with which the R.A.F. has a close connection, such as Egypt and Iraq. At the time of our visit there were also two naval officers at Upavon, who will doubtless go on in due course to No. 1 F.T.S. to teach naval personnel of the Fleet Air Arm to fly. Under present arrangements it is not essential that the Fleet Air Arm should have flying instructors of its own, as the R.A.F. is to remain responsible for the training of F.A.A. personnel up to the time when they take up specialised naval work; but, none the less, it is a good thing that some of the flying instructors at No. 1 F.T.S. should be naval men. There was also one officer of the Auxiliary Air Force, from the County of Kent Squadron, undergoing training.

The course at Upavon lasts for eleven weeks. In the first fortnight the C.F.S. instructors put the pupils through their flying paces, note and correct any faults which they have developed, and generally try to improve their flying. The pupils are divided into four flights, and in each of the two large hangars two flights are accommodated and work together. In each hangar one flight is equipped with Tutors and the other with more advanced types—Anson, Oxford, Hart Trainer and Fury. The two flights exchange machines as is found convenient, for obviously none of the future instructors can be kept on Tutors all through the course. Perhaps when the light bomber squadrons have been re-equipped a larger number of Hart-type machines may be made available for the C.F.S. Apart from the sequence of instruction, the C.F.S. aims at giving each pupil experience in twin-engined types and in single-seater fighters, so that he will not only be expert in flying those types himself, but will know how to give instruction in flying them. Each pupil also does a course of eight or nine hours in the Link Trainer, so that he will know how to instruct in it. The pupil also gets from three and a half to four hours of night flying in both the front and the back seat.

During their course the pupils are paired, not necessarily officer with officer and airman with airman, and the two work together. One will sit in the Link Trainer and the other will check his work, and then they will change about. Likewise, in the afternoon the pupils fly in pairs, one acting as instructor and the other as pupil, so that they can practise what they have been taught in the morning, and again they take turns at instructing.

The pupils are also divided into two classes. After breakfast, both classes attend lectures from 08.45 to 09.25 hours. At 09.45 one class flies while the other attends another lecture. In the afternoon there is flying for all from 13.45 to 15.00. At 15.20 there is an hour's lecture for both classes together. There is no Chief Ground Instructor, and the Chief Flying Instructor is responsible for the organising of the lectures. The subjects taught are theory of flight, airmanship, navigation, flight technical administration, equipment and meteorology. There is also a weekly discussion on Mondays on the subject of flying instruction, held by the Chief Flying Instructor, at which the pupils are encouraged to put forward any views they may hold on the subject. Sometimes quite useful suggestions are made by pupils, and the C.F.S. is always ready to adopt good ideas. There is none of the "don't-teach-your-grandmother-to-suck-eggs" spirit about the C.F.S.

Wednesdays and Saturdays are half-holidays, and everybody can play games or do what he likes. Exercise is always and everywhere regarded by the R.A.F. as essential for a pilot as well as for an aircraftman, for without perfect physical fitness both flying and maintenance would soon suffer. There is a good golf course at Upavon for the use of all ranks. (*Concluded overleaf*)



A panorama of Upavon aerodrome, which has seen many changes of tenants. Here the C.F.S. began its career in 1912. Later it was the home of Nos. 3 and 17 (Fighter) Squadrons. Once it belonged to the Coastal Area. A few miles away lies Netheravon, soon to be occupied by No. 1 F.T.S.

That outlines the main work of the C.F.S. It has some other tasks as well, but before describing them one must mention how the expansion has affected the school. When the expansion programme started one of the great difficulties was to find enough instructors, for the R.A.F. Flying Training Schools sprang up suddenly in numbers from two, at Sealand and Grantham, to ten in this country, while the civil schools, now known officially as Elementary and Reserve Flying Training Schools, which only numbered four, began to increase at a rapid pace, and have now risen to twenty-seven. Under "Scheme L" there will be a further increase.

The C.F.S. has therefore been required to put on a bit of a spurt. This autumn, instead of taking in one course of about forty pupils and training them for eleven weeks with some seventy hours in the air, the school will work in two shorter courses of nine weeks each with fifty-five hours' flying, and each of these courses will consist of about fifty pupils. In the new year there will be another short course, and then it is hoped that the immediate needs of the situation will have been met, and the C.F.S. will be able to return to its normal routine.

New Scheme

Expansion has also led to a shortage of experienced officers in the squadrons. *Flight* has remarked before now on the dearth of Flying Officers and Flight Lieutenants in squadrons, and the authorities are reluctant to aggravate this position by sending experienced officers to the C.F.S. to be trained as instructors. It is therefore proposed to accept some specially selected men straight from the Flying Training Schools and train them at the C.F.S.

The Central Flying School also keeps its beneficent eye on the training standards and methods in Elementary and Reserve Flying Training Schools. Pilots who have been trained as instructors at civil flying schools report for test at the C.F.S. at the end of their course. The instructors at Upavon examine them and give them the O.K. or the reverse, but do not allot them to any C.F.S. category. Last year, however, a start was made in giving courses of three weeks' duration to instructors from the Elementary and Reserve Schools who had never taken a C.F.S. course. Only four of these civil instructors are taken at a time, and they are given a C.F.S. category.

One regular duty of the C.F.S. is to give refresher courses to officers who have been on administrative work and have not been able to keep in full flying training. It also sometimes gives a conversion course to a pilot who has been in, say, a flying boat or heavy bomber squadron and is being transferred to single-seater fighters. The instructors at Upavon are all expert on all types of landplanes in the Service, and all have proved their worth as instructors at some F.T.S. before joining the C.F.S. It is a cardinal principle at Upavon that it never appoints one of its own pupils straight to its own staff.

Staff visits are another regular duty of the C.F.S. instructors. Each year members of the C.F.S. staff visit and inspect each F.T.S., each Elementary and Reserve F.T.S., each Auxiliary squadron and each University squadron, to see that the pure doctrine and practice for which Upavon is responsible is observed at all those training units. That means about seventy visits in the year, and they include one to No. 4 F.T.S. at Abu Sueir. During these visits the staff of the unit is examined and members of the staff may have their category raised if the inspecting officer from Upavon judges them worthy.

We may end this article with an interesting story. An Army officer, who is the brother of a well-known pilot on the Reserve of Air Force Officers, was taught to fly at Leuchars and was posted to an army co-operation squadron. After a while he took to the bad habit of making heavy landings and bending undercarriages. His C.O. sent him up to Upavon for examination. The C.F.I. found him quite a good pilot in the air, but ragged in his landings, and recommended him for a course of special instruction. It was found that his weakness came on in patches. Sometimes for a while he came in quite well, and then he would begin either to overshoot or to undershoot. At last he was sent to the medical officer, to whom he confessed that he sometimes had toothache. His mouth was X-rayed, and an abscess was discovered under a wisdom tooth. He went into hospital and had the tooth removed (sometimes a nasty little business, in the case of a wisdom tooth), and when he emerged his trouble was all over. The abscess had been upsetting the balance of his eye muscles, so that when it was active he could not judge his approaches. He went back to his squadron, and so far as is known has never made a bad approach or landing since. Less understanding treatment might have barred him from flying for the rest of his life, and a good pilot would have been lost to the country. That officer's gratitude to the C.F.S. is unbounded.

Some of the C.F.S. instructors. Names, left to right, are :— Flt. Lt. P. A. Hunter, Flt. Lt. H. W. Marlow, Flt. Lt. P. E. Drew, Flt. Lt. J. S. McLean, Flt. Sgt. D. A. Upton, Flt. Lt. G. D. Stephenson, Flt. Lt. R. L. Wilkinson, Sqn. Ldr. D. D'Arcy Greig, D.F.C., A.F.C. (Chief Flying Instructor), Sgt. J. C. Wheeler, Flt. Lt. F. W. C. Shute, Flt. Sgt. R. W. Jarred, Flt. Sgt. A. R. Glading, Flt. Lt. H. W. Mermagen, Flt. Sgt. J. O. Barnes, Flt. Lt. P. S. Salter, Flt. Sgt. R. E. Kirlew, Flt. Sgt. T. A. Newton, Flt. Sgt. S. J. Mansell, Flt. Sgt. P. C. Price, Flt. Sgt. W. Corden, Flt. Sgt. L. F. Humphrey.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

CLUB SUBSIDIES

Rhodesia Not Quite So Fortunate

MY letter, published in the issue of June 23, has led to some criticism in this country and Southern Rhodesia. According to my correspondents the heading to the letter gives the impression that the subsidies outlined therein apply to both territories, whereas they are only applicable to Northern Rhodesia. I should also like to correct my statement to the effect that a person renewing an A licence is subsidised to the extent of £20. The correct amount is £5.

Some impressions on the performance of aircraft in this part of the world may be of interest. Recently I was flying in the "Tiger Moth" purchased by the Flying Club of Northern Rhodesia. Accompanying me was the club's ground engineer, and we required about 500 yards before the machine was airborne. On reaching an altitude of 2,000ft. above the aerodrome, it was impossible to get the aircraft to climb higher at an engine speed of 2,160 r.p.m. Finally a spin was attempted and 1,000ft. were lost in the first half-turn.

Undoubtedly, the fact that the aerodrome is situated at 4,100ft. above sea-level and the temperature of about 75 degrees in the shade accounted for these phenomena. However, a few days before this same machine, piloted by the G.E., gained 5,000ft. in something like eight minutes. Thus we have to suffer!

A. D. SHAW.

Kitwe, N. Rhodesia.

ESPERANTO

Its Value to Aviation

I READ with interest a recent letter in *Flight* from Mr. Lewin, of Handley Page, referring to the international language, Esperanto. It may interest you to know that in a minor way Esperanto has already been of some service to aviation. At the beginning of 1937 the present writer embarked on a lecture tour of Scandinavia. Illustrated by 45 slides, of which 13 were supplied through the kindness of Imperial Airways' Publicity Manager, Mr. Snowden Gamble, the lecture showed the development of flying from the early days of the pioneers to the Short Empire Boat, the Ensign and the Short-Mayo Composite of modern times.

In the spring and autumn of last year the lecture was given on 70 different occasions in Sweden and Denmark, either directly in Esperanto to Esperanto clubs or to the general public with an interpreter, and sometimes in English to schools. The tour was organised by the Swedish Esperanto Federation.

Everywhere from Lapland to Jutland the audiences showed great interest for the unusual topic and it no doubt did much to make them "Imperial-Airways-conscious." Scandinavians read a lot about American and German superiority and it is well to show them in this simple way that British aviation is not altogether moribund. Without the assistance of the Esperanto movement, such a lecture would have been confined to the much smaller audiences of the Anglo-Swedish clubs in Gothenburg and Stockholm.

I can heartily endorse the remarks of Mr. Lewin regarding the desirability and suitability of Esperanto for international communications. Having used Esperanto in eight different countries in conversation and in correspondence with people of a score of nationalities, I can say that the linguistic side of the "Babel" problem has now been solved. There remains only the practical politics of spreading the news.

F. H. TURNER,

Rochester. Whit. Scholar, G.I.Mech.E.

SOME C.A.G. OPINIONS

Machine Equipment of the C.A.G.

I READ in your journal that you do not consider that pilots trained under the Civil Air Guard scheme will be of any value [we did not put it as strongly as that—ED.] as pilots once placed in Air Force machines.

May I say a word in their defence? First, your reason for saying so is, I believe, that all the military equipment which is standard on Service types will be so much double dutch to them. So much I admit. But ask any pilot who flew in the Great War how long 75 per cent. of the said equipment will last during combat. One burst of machine-gun fire will put most of it out of commission and so we are back to where flying really started—without instruments.

However, all that remains to be proved. Secondly, I live close to London Air Park, where pilots are being trained for the Air Force Reserve. These men are starting on machines which, I believe you will agree, are no more advanced than the club machines which the C.A.G. proposes to use. My point here is that the ultimate value of the Air Guard is that it will provide a good supply of pilots already partly trained while there still remains the possibility that the scheme will be extended and provide Service machines for advanced training.

It is with great regret that I note that "Indicator" takes such a selfish view of the C.A.G. Each member will be offering his services to his country in return for what is really a small reward, and those who have obtained their ticket under standard rates must give way and realise that flying is not only now for the idle rich.

S. KINGSHOTT.

Feltham.

"Indicator" Taken to Task

ALTHOUGH "Indicator" is apologetic when making his cynical remarks regarding the "worthy people" who are about to fly under the auspices of the C.A.G. and of their "ultimate value," I deplore his snobbishness in referring to the fact that people of his class have paid "hard-earned or unearned" money in learning to fly, and that flying is to be learned now for next to nothing.

I would like to point out, with all due respect, that the proportion of expenditure on flying training, to earned income of most members of the C.A.G., will be as great, if not greater, than that of amateurs of the "'Indicator' class."

In regard to their ultimate value, while admitting the comparative uselessness of these C.A.G. pilots in case of war (without additional training), surely the mere fact of making lesser folk air-minded is an achievement worthy of the movement, and in the interests of progress, would have an advantageous effect on the population, a great number of whom still think private flying a pastime of the idle rich, and look askance at large subsidies to which they contribute, but get nothing tangible in return. "Indicator" might at least encourage us minnows and not snub us.

F. MOUNTFIELD.

Watford, Herts.

["Indicator" says: "A merited rebuke. The comparative income remark is worth thinking about. Nevertheless, I and hundreds of other amateurs saved money to learn to fly by giving up a number of other pleasant things—because flying was worth more than these things. I feel 'snobbish' only about those who could (but were not keen enough to try to) afford it at the old rates, but who are now taking advantage of what is, to them, simply State-ordered charity. How many of the applicants, I wonder, are honestly keen, but were quite unable to pay the old rates? If the proportion of these is really high, then the C.A.G. is doing the work for which it was designed and freedom is lost in a good cause."—ED.]

NOS. 18 AND 120 SQUADRONS, R.A.F.

Information Wanted

AS one who was a pilot of 120 Squadron during the period from March until August, 1919, when they were carrying the mail from Folkestone (Hawkinge and Lympne) to Cologne (Bickersdorf and Merheim) for the Army of Occupation, I am endeavouring to collect sufficient material for a book on what has now proved to be the pioneer service of Regular Air Mails out of England.

Is it possible for me, through your columns, to get in touch with any other pilots or personnel of either of these squadrons, or anyone in any way connected with this service?

L. PEARCE-GERVIS

Green Shutters,
Hellingly,
Hailsham, Sussex.

IN BRIEF

A fourteen-year-old reader, Cyril Rowland, of "Box Mill," Halstead, Essex, wishes to correspond with a kindred spirit in the United States on aviation subjects.

BERLIN-NEW YORK-BERLIN

New D.L.H. Focke-Wulf Condor "Brandenburg" Reaches New York in 24 hr. 56 min. and Returns in 19 hr. 54 min.

WITHIN twenty-five hours of leaving Berlin, the new Deutsche Lufthansa Focke Wulf Condor, *Brandenburg*, landed at Floyd Bennet Airfield, New York. Two days later the return flight was made in a few minutes less than twenty hours.

The departure of the *Brandenburg* on its outward journey was kept a complete secret. In fact the first news the world had of the flight was the receipt of a radio message announcing that Newfoundland had been reached. Actually the start was made from Staaken, the military aerodrome near Berlin, at 19.30 hr., on Wednesday, August 10th. Capt. A. Henke was in charge of the flight, and was accompanied by his co-pilot, Flt./Capt. R. von Moreau, a radio operator and a mechanic.

Flying a Great Circle course, the Condor passed over Scotland and reached Newfoundland shortly after 14.00 hr. the next day. According to reports, fine weather conditions prevailed over the Atlantic, but headwinds were encountered when flying down the coast of Canada towards New York. The total distance covered was 3,970 miles and the total time taken was 24 hr. 56 min.

On landing at New York it was discovered that an oil lead to one of the four B.M.W. Hornet engines had fractured, as a result of which the return flight was postponed for a day. By last Saturday the *Brandenburg* was ready for its homeward flight. With close on 2,000 gallons of fuel on board it left Floyd Bennet Airfield shortly before 9.00 hr. (14.00 hr. B.S.T.), heading direct for Berlin. With fine weather once again favouring him Capt. Henke was able to increase his average speed, on account of a steady following wind. The British Isles were crossed shortly before 07.00 hr. last Sunday and three hours later the Condor touched down at Templhof, Berlin, having accomplished the journey in the record time of 19 hr. 54 min., bettering the late Wiley Post's time by nearly five hours.

Two interesting points arise out of this brilliant achievement. In the first place the *Brandenburg* is one of a fleet of Focke-Wulf Condors ordered for Deutsche Lufthansa and was to all intents in standard trim except for the extra fuel tanks fitted to give it a wider range. Incidentally, the normal range when carrying a full load of 26 passengers, mail and freight is claimed to be just over 1,000 miles.

The second point is an assumption, based on the lack of reports of the Condor's progress both on the outgoing and on the return flights, that the fullest use was made of the machine's own D.F. radio with, possibly, the addition of accurate back bearings from home stations.

Heroes of the moment, the crew of the *Brandenburg* prepare to face a typical Berlin welcome. Capt. A. Henke leads his co-pilot, Flt./Capt. von Moreau, down the steps. They are followed by the mechanic, Dierberg, and W/O Kober.

Full details of the Condor were published in *Flight* of December 23, 1937, while "Indicator's" impressions of a journey in one were published in the issue of June 30. Briefly, the Condor is an all-metal monoplane with a wing-span of 108ft. It is powered by four B.M.W. Hornet engines, with which it is capable of a cruising speed of 205 m.p.h. at 9,850ft. In the near future the type will be fitted with the more powerful B.M.W. 132 Dc. engines which will raise the speed by 25 m.p.h.

In Berlin it is hoped that the Condor's fine performance on its first flight to New York will pave the way for a regular service between Berlin and New York. It was not in any way looked upon as an attempt to break or make records. In greeting the crew on their return, General Milch inferred that they would have at their disposal a machine (possibly a Condor) with which to break Howard Hughes' world flight record.

In spite of a heavy downpour, a vast crowd waited at Templhof, Berlin, to give the Focke-Wulf Condor, *Brandenburg*, a tumultuous welcome on its return from New York in under twenty hours. On the outward journey it covered the 3,970 miles in 24 hr. 56 min.

PRIVATE FLYING

"Flight" photograph.

CABIN VERSION: The new Moth Minor, which should be in production early next year, in its cabin form. It is a tandem-seater in which the pilot sits ahead, with a really good view forwards and over the leading edge.

Topics of the Day

Another Lesson

A HOLIDAY from all this C.A.G. discussion. A few weeks ago I suffered an experience which, in retrospect, provides both a minor lesson for us all and at least some slight justification for the often-considered plan of painting place names on gasometers and other suitable things. As far as the latter is concerned, I have always felt mildly superior about it, and believe, in any case, that the Air Ministry, at the slightest suggestion of war possibility, would immediately, for some obscure reason, have the whole lot rubbed off. However, just for once I would have been very glad indeed of at least one town's painted name.

The moral can be stated very simply. Never try to navigate casually in bad weather and never mix your methods. Either follow your railway line to the bitter end, or stick unswervingly to a previously calculated compass course.

On the day after the Exeter Airport opening the clouds in the morning were more or less down on the ground. By mid-day these had lifted sufficiently to permit tortuous air travel, but were still sitting firmly on all the high ground. I chose to follow the excellent Great Western Railway through Taunton and between Salisbury Plain and the Mendips.

At Taunton conditions were not too bad, and I took a short cut to join the main line somewhere near Castle Cary. I knew the magnetic track and allowed for a wind which should have been dead aft, and negligible at that. The wind was neither aft nor negligible and, as it happened, my drift was about seven or eight degrees to port.

None of this should have mattered since I was all ready and preparing to pick up and duly note the various railway lines on my corner-cutting track. All went well. Two lines were crossed, each at an angle which gave me no cause for wonder (and with stations in the right places), but the third not only appeared from the wrong direction, but was of the single track variety, whereas I knew that this, according to my calculations, should be a secondary main line.

Duly depressed, but feeling that somebody may have built a new railway since my map was originally drawn, I carried on. The ground rose and the clouds came down. Instead of Castle Cary, something very strange and unrecognisable appeared over the nose. It was Shepton Mallet, but I couldn't place it from a height of a hundred feet. Even Glastonbury Tor, lying wraithlike to port, had left me cold. All that could be done was to push on knowing that, if the worst came to the worst, it would be possible to turn right round towards the lower ground. As it happened, an unmistakable Frome appeared to starboard a minute or two later and all was well.

A study of the map in comfort showed afterwards that the eight-degree drift to port had taken me over railway lines which, in the prevailing conditions, were identical in layout and E.T.A. to those which I should have crossed, and the machine had, in fact, drifted north of the main line which I thought I was too clever to follow.

To repeat: Never, in bad weather, try to be clever.

Obstacles

INCIDENTALLY, it was on the outward trip to Exeter in rather similar conditions that I realised the importance of taking due notice of obstruction signs on aviation maps.

A series of four-hundred-foot wireless masts may seem very little and unimportant when flying in good weather at 1,500ft., but when you are forced to fly at 500ft. or less, and rain is obscuring the windscreen, these obstructions can be very real and bristly. That is one of the reasons why it is possible, with good cause, for otherwise strong men to panic when mildly lost. The fact that one knows approximately where one is makes it all the worse when there are obstructions of this kind in the particular area.

Mountains, and even tall chimneys, can usually be seen very easily even through a rain-obscured screen, but nothing is so completely ethereal and yet at the same time so

very well braced and hard to hit as a wireless mast. That is where Bradshaw flying in such circumstances can relieve the mental tension.

Drift

THE business of being accidentally drifted off one's course brings another small, though not often appreciated, point to light. If you are, for instance, flying in a strong wind on a course five degrees off wind an error of a few degrees in course-keeping can make a tremendous difference on one side of the track to be, as the book has it, "made good," whereas a similar error on the other side causes no appreciable change.

The reason is obvious enough since for every degree of error out of wind the drift is increasing in a kind of arithmetical progression up to the point that when flying at an airspeed of 100 m.p.h. in, for instance, a beam wind of 30 m.p.h. the drift allowance must be, in fact, as much as 18 deg. The point is that it should be remembered that when one's track is only very slightly off-wind a change of a degree in one direction is equal to two in the other.

When in doubt, therefore, and particularly when momentarily lost, any change should be made towards a compass course on which there is no drift whatever. Otherwise within a quarter of an hour you may find yourself as much as ten miles to one side or the other of your imagined track.

This is somewhat similar in basic principle to the trouble which entails the discovery of novices, lost from Reserve schools and elsewhere, almost invariably a distance downwind from the last recognised point.

All of which (and particularly the Exeter affair) reminds me of the story of the well-known and experienced navigator who, after enlivening his hearers with a harrowing story about blind-flying followed by a descent through the clouds until his altimeter registered zero, terminated his tale with the anti-climaxical words: "Then I saw a town below me, recognised it, changed course *one degree*, and reached my destination." I will offer a special prize to anyone, transport pilot or otherwise, who can prove himself capable of flying continuously to an accuracy of even two degrees. Fortunately, for our sense of well-being, errors usually cancel themselves out. The word "continuously" is important.

INDICATOR.

FROM the CLUBS and SCHOOLS

HULL

A TOTAL of 114 hr. 25 min. was spent in the air by the Hull Aero Club during July and Mr. E. Haricroft qualrified for his "A" licence.

READING

The organisation for the C.A.G. is going ahead well. The Whitney Straight has been busy on cross-country flights. Mr. A. T. Wylie completed the tests for his "A" licence and Miss Cavendish Clark renewed hers.

REDHILL

The Fox, Leopard and one Moth spent the week-end at Le Zoute and a total of 76 hr. 10 min. flying was logged by the Club. Four instructors' courses were started. Applications for the Civil Air Guard are still pouring in.

BOURNEMOUTH

Cross-country flights to the Isle of Wight, Birmingham and Croydon were included in the total flying time of 40 hours. The winner of the recent club landing competition was Mr. G. A. Baker, with an average of 18 paces from the target.

YORKSHIRE

The thunderstorms, which have lasted, on and off, for eight days, have seriously reduced flying, though 97 hours has been flown so far during the month. The usual "Twelfth" trips were undertaken for the transportation of grouse to London.

BORDER

So far advanced are the arrangements for the C.A.G. scheme at Carlisle that Border Flying Club is ready to begin work as soon as the Air Ministry gives the signal. Extra instructors and machines have been mobilised. The Tipsy two-seater was demonstrated last week.

HYDERABAD

Of the 39 hr. 5 min. total flying done by the Hyderabad State Aero Club during July, five minutes were spent in solo, for which, maybe, Capt. J. M. C. Hoblyn, who made his first solo flight, was responsible. The small amount of flying time was accounted for by the high winds and rain throughout the month.

HANWORTH

While torrential rain has, on several occasions during the last week, stopped flying most successfully, a fair average has been maintained and 79 hr. 40 min. was logged. On Saturday next, August 20, the competition for the A.E.M. Challenge Trophy will start. The last day for entries to this competition is Sunday, August 28.

BARTON (BEDS)

Owing to the R.A.F. exercises, flying was down for last week. More enrolments for the Air Guard have been received. Mr. G. W. Dicker made his first solo and Mrs. Winifred Crossley has been appointed Vice President. A general meeting is fixed for September 7, to be followed by a dance, and an aerobatic display will be held on August 28.

EDINBURGH

The total flying put in last week by pupils at Macmerry was 20 hr. 30 min., of which 5 hr. 30 min. was solo work.

Needless to say, the Edinburgh Flying Club has received the familiarly large number of C.A.G. applications—in this case 600. During the week ended August 5 the Club members put in 10 hours of dual and the same number of hours of solo flying. Amusing airline passenger figures for that week at Macmerry are: Inwards, three and a bicycle; outward, two.

C.A.S.C.

The total time of 14 hr. 50 min. for last week-end included a cross-country flight to Barton by four members. Weather permitting, it is hoped to arrange another flight to Le Touquet next Sunday.

BROOKLANDS

Members of the C.A.G. already holding "A" licences will be able to start their flying on September 1, whilst *ab initio* flying will start a month later. First solo flights were made last week by Miss Leith and Messrs. Whithard, Golant and Surridge. Seventy hours was the total time put in during the week ended August 14.

HERTS AND ESSEX

In spite of the ban on flying for the Air Exercises during the week-end of August 4, 214 hours were logged for the fortnight up to August 11. Mr. M. O'Donovan flew off his final "B" licence cross-country, Messrs. S. R. Pemberton and F. Murfet passed passenger-carrying tests and eight new members joined. A visit by four of the club machines was made to the Continent.

CINQUE PORTS

Among notable visitors to Lympne last week were Mr. Leslie Hore-Belisha, who inspected the Territorial Camp in Otterpool Lane, and Col. and Mrs. Lindbergh who, when passing through on their way to France, dropped in for a snack lunch. Col. Dempsey and Mr. B. Ward made their first solos and Mr. D. Constant passed his "A" licence tests. Forty-nine hours' flying was recorded for the week ended August 14.

NORFOLK AND NORWICH

In Norwich the R.A.F. exercises restriction was certainly felt, but over 20 hours were put in last week, including a flight by the chief instructor to Ford aerodrome. The Public Schools Aviation Camp opened on the 9th and Pangbourne, Epsom, Repton, Dulwich, Clayesmore, Malvern and Norwich are some of the schools represented. The boys should be qualified for their "A" licences in a week or two, leaving a further two weeks for solo flying.

BRISTOL

Entries are invited both for the Club medal golf handicap competition taking place on September 1, and for the annual car treasure hunt on September 10. Applications for the C.A.G., of course, continue, and up to date 500 have been received. Successful "A" licence candidates include Messrs. S. J. D. Acland and A. G. Taylor, while first solo flights were made by Messrs. H. C. Hobhouse, G. E. G. Hope-Johnstone and G. G. Whiting. Flying for July reached 110 hours.

The Eastbourne Affair

NEXT Saturday the new Eastbourne Club building will be officially opened by Capt. Balfour, and a flying meeting is being duly staged to commemorate the event. Most of the details were given in *Flight* of August 4, and up to date there have been acceptances from sixty-five aircraft owners and clubs, so that Wilmington aerodrome should have a crowded appearance the day after to-morrow.

There is an arrival competition, the zero second of which is between 12 noon and 2.15 p.m.—a period which is long enough to prevent what is sometimes a rather dangerously crowded atmosphere during a competition of this nature. There will be three visitors from Germany, two from France, and two from Belgium, and No. 79 (F) Squadron will give three separate performances.

The opening ceremony will take place at 2.30 p.m., and the flying programme will start at 3 p.m.

C.A.G. DEVELOPMENTS

The Clubs Consider the Position : The Controlling Body : Some Interesting Figures

AS might be expected, the General Council of Associated Light Aeroplane Clubs has lost little time in convening a meeting of the clubs and of going into the question of the supply and distribution of machines for Civil Air Guard requirements.

At a meeting at the Air Ministry on August 10 Mr. E. C. Bowyer, representing the Society of British Aircraft Constructors, made a statement of the general position and replied to questions raised by the representatives of the various clubs, and it was then unanimously decided to appoint a sub-committee to meet the manufacturers' representatives.

This sub-committee will also carry out all future negotiations with the Air Ministry on behalf of the clubs. The members are: Mr. W. Lindsay Everard, M.P., Major K. M. Beaumont, D.S.O., Major Gilbert Dennison, Major Alan Goodfellow, Flt. Lt. David Llewellyn, Mr. Whitney Straight and Cdr. H. E. Perrin All areas except those in Scotland appear to be covered by this selection of members. Mr. Everard, apart from his position as chairman of the Royal Aero Club, has been interested in the light aeroplane club movement almost since its inception, and in supporting the County Flying Club at Leicester has done a great deal towards proving or disproving the practicability of the C.A.G. scheme. Three of the very first clubs in the country are represented by Major Beaumont (London), Major Dennison (Midland) and Major Goodfellow (Lancashire), while Flt. Lt. Llewellyn may be taken as voicing the opinions of the Brooklands Club as well as those of the Cinque Ports Club, where he is chief instructor, and Mr. Whitney Straight, of course, is managing director of the Straight Corporation, which has been prominent in efforts to popularise flying by the general public throughout the country. Altogether a very satisfactory list of names. Incidentally, both Mr. Lindsay Everard and Major Goodfellow have been nominated to the C.A.G. Board of Commissioners.

The Question of Supply

In his statement (which closely followed "Indicator's" comments in *Flight* of August 4) Mr. Bowyer said that the chairman of the S.B.A.C., Sir Charles Bruce-Gardner, had been asked by the Air Ministry to investigate the question of the supply of suitable C.A.G. machines. The society was disturbed to discover a general feeling that, at least, in the early stages of the scheme, it would be necessary to buy some foreign machines. This was the first big opportunity for the makers of small aeroplanes, and if this opportunity was lost, even in the early stages of the scheme, it would be a crushing blow to the whole industry. The manufacturers recognised the fact that the clubs must decide on their own requirements, but they were anxious for co-operation and Mr. Bowyer suggested that such co-operation must, in the long run, be best both for the clubs and for the industry.

Manufacturers of light aeroplanes, he said, could not be blamed for the fact that they were not immediately able to meet these requirements. For years they had been struggling on with little or no encouragement, and the C.A.G. scheme had been put forward entirely without notice or warning.

They were anxious to know what was the likely number of machines required by the clubs, when these machines would be required, and, if possible, which types were actually fancied. They were inclined to think that the machines already in service, with those which might be immediately available from various sources, would be adequate to fill the clubs' requirements until next spring, by which time there was every prospect that the demands could be satisfied.

Mr. Bowyer submitted estimates in support of his argument and said that these figures show that the scheme would not be likely to suffer by waiting for British machines—particularly in view of the shorter flying days and the bad weather which could be expected during the winter.

At the meeting Colonel Sir Joseph Reid was voted to the chair, and Commander Perrin, of course, held the watching brief on the proceedings. Some fifty clubs were represented, these being:—

Royal Aero Club; B.C.C. Flying Club; Bedford Aero Club; Bournemouth Flying Club; Bristol and Wessex Aero Club; Brooklands Flying Club; Cambridge Aero Club; Cardiff Aeroplane Club; Cinque Ports Flying Club; Civil Service Flying Association; Coventry Aero Club; Eastbourne Flying Club; Edinburgh Flying Club; Exeter Aero Club; Hampshire Aeroplane Club; Herts & Essex Aeroplane Club; Hull Aero Club; Insurance Flying Club; Ipswich Aero Club; Lancashire Aero Club; Leamington, Warwick and District Aero Club; Leicestershire Aero Club; Liverpool and District Aero Club; London Aeroplane Club; London Air Park Flying Club; London Transport (C.B.) Sports Association Flying Club; Malling Aero Club; Midland Aero Club; Midland Bank Flying Club; Newcastle-upon-Tyne Aero Club; Norfolk and Norwich Aero Club; North Staffordshire Aero Club; Northamptonshire Aero Club; Plymouth and District Aero Club; Portsmouth Aero Club; R.A.F. Flying Club; Reading Aero Club; Redhill Flying Club; Romford Flying Club; Scottish Flying Club; South Coast Flying Club; Southend Flying Club; South Staffordshire Aero Club; Thanet Aero Club; Tollerton Aero Club; University Aero Club; Wiltshire Flying Club; Witney and Oxford Aero Club; Yorkshire Aeroplane Club; County Flying Club; Ely Aero Club; Heston Airport Club; Household Brigade Flying Club; Lincolnshire Aero Club; Northern Aviation School and Club; Old Etonian Flying Club; Luton Flying Club; and Blackpool and Fylde Aero Club.

The Five Commissioners

ALTHOUGH certain formalities must still be concluded before the names of the five honorary Commissioners who will look after the C.A.G. can be officially announced, the appointments now appear to be fairly certain.

It was already known that the Marquess of Londonderry would be Chief Commissioner, since he had already accepted this office at the time of the first announcement; Air Commodore J. A. Chamier is already working hard as honorary secretary to the Commissioners, and it had been strongly rumoured that Mrs. F. G. Miles would be the women's representative.

The three previously unnamed members of the Board are, as might be expected, Mr. Lindsay Everard, M.P., who is chairman of the Royal Aero Club and a private owner on a big scale; Major Alan Goodfellow, who has been long associated with the Royal Aero Club, and with the Lancashire Aero Club in particular; and Mr. Robert Murray, who is the Scottish representative. Mrs. Miles, of course, is the wife of the managing director and chief designer of Phillips and Powis Aircraft, and is herself both a designer and an amateur pilot.

Insurance Costs

SO far there has been no sign that any appreciable reduction in personal insurance premiums will be made in the case of Civil Air Guard pilots. As "Indicator" pointed out in last week's issue the position is a difficult one and short of Government assistance, or simple philanthropy on the part of the companies themselves, very little can be done about it. The Air Ministry has already stated that its present commitments are sufficiently great, but adds that any insurance company producing a special scheme would receive support and encouragement.

As a matter of interest, and in reply to the many questions which have been asked about personal flying insurance rates, we are giving some figures which have been sent to us by Willis, Faber and Dumas, the insurance brokers. These may be taken as fairly representative of those at which policies may be obtained. The premiums are indicated for an insurance of £100, but, needless to say, policies will be issued up to any reasonable amount at pro rata premiums.

The figures are :—

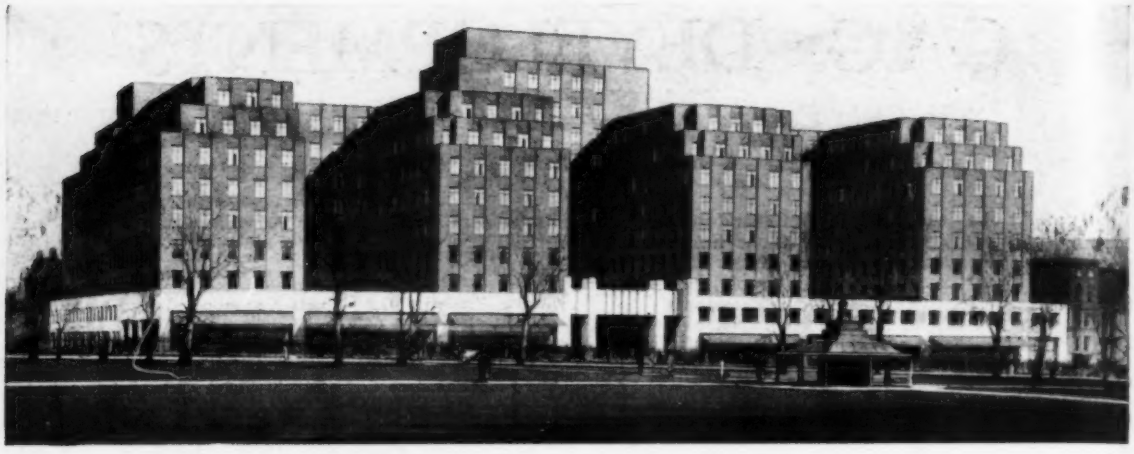
(A) Death only. Annual premium 12s. 3d.

(B) Death and loss of limbs, etc., with payment of £50 or £100 according to the nature of the injuries. Annual premium 14s.

(C) Weekly benefits. Compensation as in (B) with weekly compensation, during total disablement, of 10s. per week for a year and doctors' charges up to 15 per cent. of the amount of any claim. Annual premium 17s. 6d.

(D) Compensation as (B) and (C) but with no death cover. Annual premium 7s 6d.

(E) Additional weekly benefits for policies (C) and (D) or special weekly benefit for policy (A) for £1 per week. Annual premium 6s. Weekly benefits only. Annual premium 8s. 9d.



EXPANSION

New Home of Air Ministry Technical Departments

ONE day in the rather dim future the Air Ministry will be housed under one roof in Whitehall—that is, if the somewhat grandiose plans that have been laid are ever allowed to materialise. In the meantime, with expansion scheme following hot-foot on the heels of expansion scheme, the Air Ministry has been compelled to deal with the sudden increases of staff by taking over all the available office space in the immediate proximity to Adastral House, Kingsway. Thus, while the staff of the Ministry has been in a sense centralised into one district, in actual fact it has been spread over so many buildings in that district—the Kingsway area—that delays became unavoidable and expenditure rose by leaps and bounds.

At the present moment the Air Ministry occupies offices in Alexandra House, Pen Corner, Ariel House, Audrey House, Bush House, Clement's Inn, Imperial House, Ingersoll House, Melbourne House, Princes' House, Savoy Hill House, Victory House, York House, apart from the headquarters at Adastral House. There are too, of course, other departments which are housed further afield, such as the meteorological office at South Kensington.

Obviously such a scattered form of centralisation is both unbusinesslike and uneconomical, so it is not surprising that while the Air Ministry's future home remains a dream of the future, steps have been taken to deal with the present rather unsatisfactory state of affairs. In view of this the Ministry acquired last week the lease for the greater part of Berkeley Square House, a vast block of recently erected offices facing the eastern side of Berkeley Square and extending down Bruton Street. As soon as the new building is ready it will be occupied by a staff of some two thousand in number, most of which is at the moment spread out over the many blocks of offices in the Kingsway area. Provision is being made to house a further seven hundred in the event of any additional expansion scheme.

The process of moving-in will start some time towards the end of next month and the departments concerned will be those for Production, Inspection, Repairs and Maintenance, Contracts and Equipment. With them will go the respective financial and secretarial departments.

The new building in which these departments will be co-ordinated was built in little over a year by Sir Robert McAlpine and Company, Limited, to the design of Messrs. Gordon Jeeves and Hector O. Hamilton. Incidentally the latter is an owner-pilot and is one of the few practising architects who employs an aeroplane in his profession.

R.A.F. Volunteer Reserve

New Directorate Formed

THE Air Ministry announces that Air Comdre. C. W. H. Pulford, O.B.E., A.F.C., has been appointed to take charge of a new Directorate ot Volunteer Reserve Expansion which has been formed to supervise the expansion of the R.A.F. Volunteer Reserve. He will be responsible for co-ordinating all matters relating to the setting up of Volunteer Reserve centres and for organising recruitment.

There are at present in operation 27 aerodrome centres (now officially styled Elementary and Reserve Flying Training Schools) for the training of pilot personnel of the Volunteer Reserve. The expansion of the Volunteer Reserve envisages, in addition to an increase in the number of pilots, the training of substantial numbers of personnel as aircraft crews. This involves increasing the capacity of existing schools and the setting up of a large number of new schools in various centres of population. In addition, a greatly increased number of affiliated Town Centres, where ground instruction is given, and which also provide a social and recreational centre for the personnel, will be necessary.

Air Comdre. Pulford was born in 1892 in India and entered the Royal Navy in 1910, became a Flight Lieutenant in the R.N.A.S. in 1914, and graduated at the Central Flying School next year. For his services with various units afloat during the Great War he received the O.B.E. and the A.F.C., besides the French Croix de Guerre. In August, 1919, he was granted a permanent commission in the Royal Air Force, as a Squadron Leader.

Since the Great War Air Comdre. Pulford has commanded several Royal Air Force units, and after passing a course at the Royal Air Force Staff College was, in 1923, employed on Air Staff Duties at the Air Ministry. Subsequently, he completed a course at the Imperial Defence College and commanded the Station Headquarters, Heliopolis, from 1932 until 1934, when he was appointed to command the Air Armament School. In September, 1936, he was appointed Superintendent of the Reserve and Inspector of Civil Flying Schools, and when the headquarters of these formations was renamed No. 26 (Training) Group, in December, 1937, he was appointed the Air Officer Commanding. Air Comdre. Pulford was promoted Wing Commander in 1925, Group Captain in 1932 and to his present rank in July, 1936.

Two New Centres

Arrangements have now been completed for the entry of personnel for training as pilots at two further Royal Air Force Volunteer Reserve training centres, bringing the total of such centres to 29. The new centres are at Derby and Staverton Bridge, Gloucestershire (the Gloucester and Cheltenham Municipal Aerodrome), and applications are invited immediately from candidates resident in these districts.

Candidates must be between their 18th and 25th birthdays. Application should be made to the Air Officer Commanding, No. 26 (Training) Group, Royal Air Force, Hendon. The Hyde, London, N.W.9.

SERVICE AVIATION

Royal Air Force and Official Announcements : Fleet Air Arm News : Military Aviation Abroad

Equipment and Accountant Branches—Rates of Retired Pay

THE present rates of retired pay for officers holding permanent commissions in the Equipment and Accountant Branches have been under review by the Air Council and it has been decided to introduce the following improvements in the rates for officers of the ranks of Group Captain, Wing Commander and Squadron Leader placed on the retired list.

The maximum rates of retired pay for these ranks will be increased to the following amounts:—Group Captain, £678 a year; Wing Commander, £527 a year; Squadron Leader, £396 a year.

To enable officers to qualify for these increased maxima the present retired pay scale in respect of officers retiring at age 54 and above, will be amended as indicated below:—

Age on Retirement.	*Yearly Rate of Retired Pay.*	*Years of Service.*	*Addition for each extra* year of service.*	*Deduction for each deficient* year of service.*
	£		£ s. d.	£ s. d.
54	375	21	20 0 0	13 10 0
55	392	22	20 0 0	13 10 0
56	409	22	20 0 0	13 10 0
57	427	23	20 0 0	13 10 0
58	444	23	20 0 0	13 10 0
59	461	24	20 0 0	13 10 0
60	478	24	20 0 0	13 10 0

* Limited to five years.

The additional retired pay for each completed year of service in the rank of Group Captain, up to five years, will be increased to £20 a year.

Moves, etc., of Units

NO. 103 (Bomber) Squadron will move from Usworth to Abingdon with effect from September 2.

No. 150 (Bomber) Squadron formed at Boscombe Down on August 8 instead of at Usworth.

No. 4 Flying Training School

THE undermentioned officers and airmen have been awarded special assessments on completion of a course of flying training at No. 4 Flying Training School, Abu Sueir:—

Special Distinction.—A.P/O. D. K. Bednall.

Distinguished Pass.—A.P/O.s F. E. G. Hayter, F. M. Hunter, and E. G. Rands, Sgts. E. Hutton, D. J. Innes-Smith, R. W. Mason, and W. E. J. Smart.

Central Flying School Categories

THE undermentioned officers and airmen have been recategorised:—

A.2 to A.1.—Flt. Lts. W. R. Farley, J. Grandy, K. F. Ferguson, F. H. Tyson, H. J. Kirkpatrick, P. S. Salter, Flt. Sgt. Munns, A.C.L.

B. to A.2.—Flt. Lts. G. W. Golledge, P. F. Canning, O. A. Morris, W. L. Stedman, W. E. Cameron, H. J. L. Hawkins, S. E. Mackenzie, E. L. Colbeck-Welsh, A. P. Hollick, R. B. Wardman, R. K. Brougham, Flt. Sgts. Price, P. C., Edwards, H. W., Francis, E. H., Woode, A. L., Russell, L. R. C., MacIntosh, G. M., Atkins, J. E., Sgts. Appleby, A. F., and Jeary, R. W.

C. to B.—Sgt. Smith, S. P.

Capt. J. E. O. Marais of the South African Air Force has been tested as a flying instructor and has been assessed at Category A.1 standard.

The undermentioned reserve officers have recently been tested at the Central Flying School, and are awarded the following categories:—

A.2.—Flt. Lt. D. H. V. Craig.

B.—Flt. Lts. J. D. H. Slade, A. W. R. Lawson, P. C. Lawrence, R. N. Younghusband, D. G. Allison, F/O.s W. B. Wilson and J. N. Addinsell.

BOMBING-UP a Blenheim during the Air Exercises. It will be noted that bombs now travel in comfort all the way.

More Airman Pilots

AN Air Ministry order gives the names of 198 airmen who have been selected for training as pilots. All these airmen come from the recommendations list of April last.

Flying Accidents

THE Air Ministry regrets to announce the following accidents:—

A.P/O. Reginald Alexander Robertson is missing and believed to have lost his life as the result of an accident which occurred in the Solent on August 10 to an aircraft of the R.A.F. Station, Gosport, Hampshire.

With reference to the disappearance on August 6 of an aircraft of No. 13 (A.C.) Squadron, Odiham, Hants, extensive air and ground searches have failed to find the aircraft and its occupant, and it must now be accepted that P/O. Douglas St. Quentin Robinson lost his life on that date.

F/O. Walter Louis Rowbottom lost his life in an accident which occurred at Mardan, India, on July 23, to an aircraft of No. 11 (Bomber) Squadron, Risalpur, India.

With reference to the disappearance on August 8 of an aircraft of No. 233 (General Reconnaissance) Squadron, Thornaby, the Air Ministry announces with regret that as extensive air and ground searches have failed to find the aircraft and the occupants it must now be accepted that the following personnel lost their lives:—Sgt. Cecil Joseph Le Patrick Gordon (pilot), A/C.2 Thomas Charles Andrews, A/C.1 Melville George Brand, A/C.1 Leslie Freeman.

Flt. Lt. Ronald John Faull Craig (pilot) and Cpl. William Hilbert Quane lost their lives in an accident which occurred at Broxton, near Chester, on August 12, to an aircraft of No. 83 (Bomber) Squadron, Scampton.

P/O. Frank Alfred Morant (pilot) and Act. Sgt. Wilfred Waller lost their lives in an accident which occurred at Caythorpe, Lincolnshire, on August 12, to an aircraft of the Electrical and Wireless School, Cranwell, Sleaford.

Sgt. D. L. B. Cabuzet (pilot), A/C. P. E. Evans, A/C. O. T. Edwards, A/C. T. E. Griffiths, A/C. K. C. Sherwin and Mr. H. Gray are missing and believed drowned in an accident which occurred off Felixstowe on August 13, to an aircraft of No. 228 (G.R.) Squadron, Felixstowe.

A/C.s Evans, Edwards and Griffiths were members of the crew and A/C. Sherwin and Mr. H. Gray were passengers.

Service Aviation

Royal Air Force Gazette

General Duties Branch

F/O. H. R. Coventry promoted to rank of Flight Lieutenant, June 15th, 1938.

The following Flying Officers granted acting rank of Flight Lieutenant, May 20, 1938:—A. J. F. Churchill, N. M. Hall, Lt. Cdr. A. M. Rundle, R.N., re-attached to R.A.F. as Squadron Leader, with effect from August 2, 1938, and with seniority July 1, 1935. Lt. A. F. Hall, R.N., re-attached to R.A.F. as Flight Lieutenant with effect from July 25, 1938, and with seniority January 1, 1936. Cdr. H. A. Traill, R.N., Squadron Leader, R.A.F., ceases to be attached to R.A.F. on return to Naval duty, August 2, 1938. Lt. W. P. Lucy, R.N., Flt. Lt., R.A.F., ceases to be attached to R.A.F. on return to Naval duty, July 29, 1938. Lt. L. C. B. Ashburner, R.N., Flt. Lt., R.A.F., ceases to be attached to R.A.F. on return to Naval duty, August 2, 1938. Flt. Lt. C. I. A. Jackson (Capt. R. Tank Corps), relinquishes temporary commission on return to Army duty, July 26, 1938.

Chaplains Branch

Rev. V. S. Dodson granted short service commission with relative rank of Squadron Leader, July 26, 1938.

Princess Mary's R.A.F. Nursing Service

Sister Miss M. R. Lake resigns appointment, August 8, 1938.

Royal Air Force Reserve

Reserve of Air Force Officers

General Duties Branch

The following are granted commissions as Flight Lieutenants, Class C, on dates stated:—H. A. S. Byrne, April 6, 1938; Maj. T. R. Wells, M.C. (T.A. ret.), April 21, 1938; Flt. Lt. J. F. Clark (R.A.F. ret.), May 2, 1938.

General Duties Branch

502 (ULSTER) (B.) SQUADRON.—Marquis of Londonderry, K.G., M.V.O., appointed Hon. Air Commodore, August 9, 1938.

605 (COUNTY OF WARWICK) (B.) SQUADRON.—F/O. M. T. Avent promoted to the rank of Flight Lieutenant, June 29, 1938. Flt. Lt. A. G. Dennison relinquishes commission on completion of service, June 29, 1938.

Auxiliary Air Force Reserve of Officers

General Duties Branch

A. G. Dennison granted commission as Flight Lieutenant, Class A, June 29, 1938; Flt. Lt. J. J. Parkes transferred from Class A to Class C, July 13, 1938.

Royal Air Force Appointments

General Duties Branch

Air Vice-Marshal.—A. W. Tedder, C.B., to D.G.R.D., Department of A.M.D.P., Air Ministry; on appointment as Director-General of Research and Development, 20.7.38.

Air Commodore.—R. M. Hill, M.C., A.F.C., to Directorate of Technical Development, Department of Air Member for Development and Production, Air Ministry; on appointment as Director of Technical Development, 1.8.38.

Group Captains.—F. W. Trott, O.B.E., M.C., to No. 1 Air Armament School, Manby; to command, 1.8.38; M. B. Frew, D.S.O., M.C., A.F.C., to No. 23 (Training) Group, Grantham; for duty as Senior Air Staff Officer, 2.8.38; C. B. Dalison, A.F.C., to R.A.F. Station, Eastchurch; to command, 22.7.38.

Wing Commanders.—C. T. Walkington, to R.A.F. Station, Hornchurch; to command, 25.7.38; R. S. Sugden, A.F.C., to No. 1 School of Technical Training (Apprentices), Halton; for Administrative duties and to command No. 1 (Apprentices) Wing, 1.7.38; P. H. Cummings, to H.Q., Fighter Command, Stanmore; for Air Staff duties, 27.7.38; W. J. Daddo-Langlois, to R.A.F. Station, Waddington; to command, 27.7.38; H. N. Hampton, D.F.C., to Directorate of Postings, Department of Air Member Personnel, Air Ministry, 1.8.38; F. F. Garraway, O.B.E., to Directorate of Organisation, Department of A.M.S.O., Air Ministry, 6.7.38.

Squadron Leaders.—G. W. Birkinshaw, to D.D.W.O., Department of A.M.S.O., Air Ministry, 22.7.38; W. G. Abrams, to No. 209 (G.R.) Squadron, Felixstowe; for flying duties, 25.7.38; W. S. Hebden, to H.Q., Bomber Command, Uxbridge; for Signals duties, 21.7.38; T. W. Hodgson, to No. 1 Air Observers School, North Coates; for Signals duties, 25.7.38; K. C. McKenzie, M.B.E., to Electrical and Wireless School, Cranwell; for Signals duties, 22.7.38; R. C. Field, to No. 144 (B.) Squadron, Hemswell; to command, 2.8.38; F. R. Drew, to H.Q., No. 5 (Bomber) Group, Grantham; for Air Staff duties, 2.8.38; J. J. Owen, to H.Q., No. 6 (Auxiliary) Group, London; for Navigation Staff duties, 2.8.38; D. J. Alvey, to Recruits, Squadron, Driffield; for Administrative duties, 1.8.38.

Flight Lieutenants.—G. A. Bartlett, to H.Q., No. 2 (Bomber) Group, Wyton; for Air Staff duties, 2.8.38; M. B. Hamilton, to Central Flying School, Upavon, 2.8.38; R. R. Fairweather, to R.A.F. Station, Amman, Transjordan, 23.7.38; J. Thompson, to No. 13 (A.C.) Squadron, Odiham, 1.8.38; G. Thripp, to No. 16 (A.C.) Squadron, Old Sarum, 31.7.38; H. G. Leonard-Williams, to R.A.F. College, Cranwell, 21.7.38; R. C. Dawkins, to R.A.F. Station, Hornchurch, 25.7.38; J. C. Sisson, to R.A.F. Station, Lee-on-Solent, 8.6.38; B. Ball, to R.A.F. Station, Bircham Newton, 23.7.38; O. H. D. Blomfield, to R.A.F. Station, Usworth, 21.7.38; M. Dawnay, to R.A.F. Station, Waddington, 24.7.38; C. F. Pearce, to R.A.F. Station, Abingdon, 21.7.38; J. A. Robinson, to R.A.F. Station, Catterick, 24.7.38.

Equipment Branch

Squadron Leader.—F. A. R. Smith, to No. 1 R.A.F. Depot, Uxbridge; for Equipment duties, 22.7.38; H. J. Young, M.B.E., to the Packing Depot, Sealand; for Equipment duties, 28.7.38.

Flight Lieutenant.—M. H. Robinson, to D. of E., Department of A.M.S.O., Air Ministry, 2.5.38.

Medical Branch

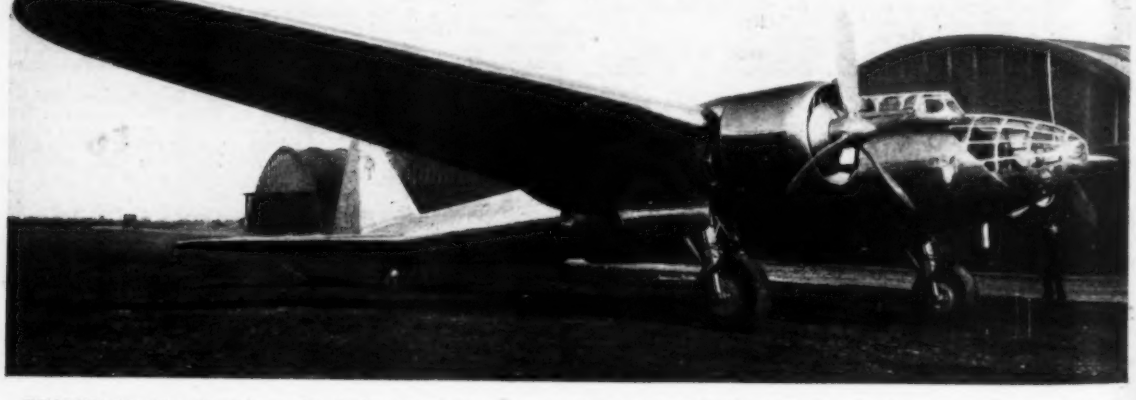
Wing Commanders.—J. D. Leahy, M.C., to Home Aircraft Depot, Henlow; for duty as Medical Officer, 25.7.38; W. E. Hodgins, to H.Q., Coastal Command, Lee-on-the-Solent; for duty as Deputy Principal Medical Officer, 1.8.38.

Squadron Leader.—G. E. Church, to No. 2 School of Technical Training (Apprentices), Cosford; for duty as Medical Officer, 1.8.38.

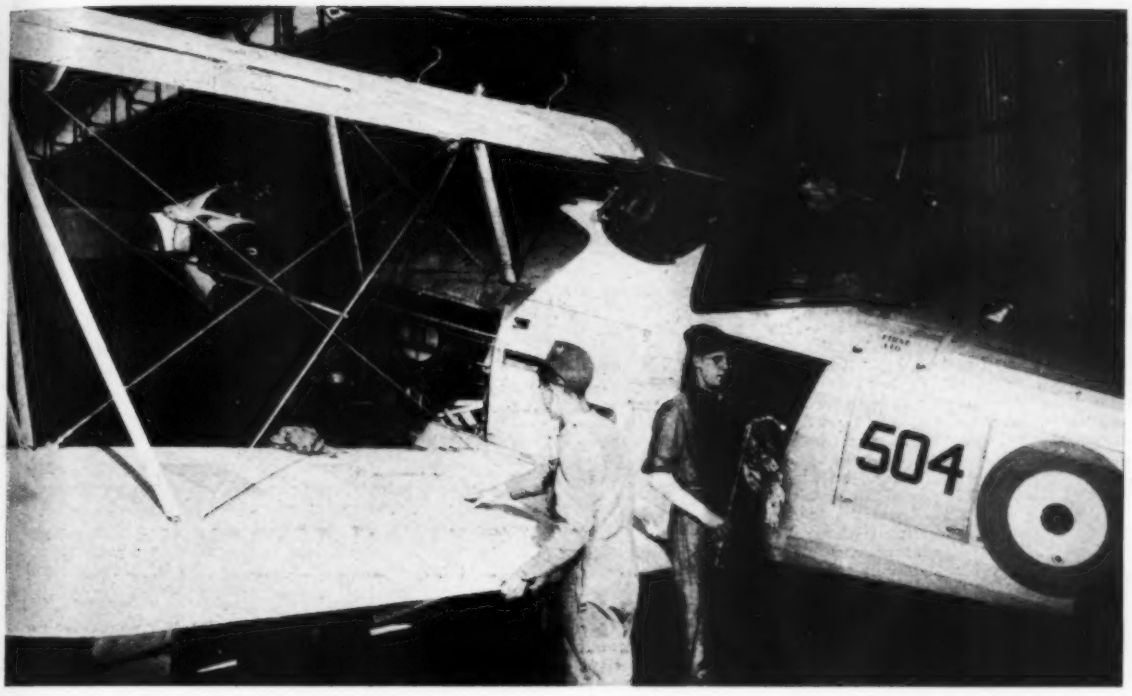
Dental Branch

Flight Lieutenants.—W. V. A. Denney, to Home Aircraft Depot, Henlow, 28.7.38; R. H. Marthews, to No. 2 School of Technical Training (Apprentices), Cosford, 2.8.38; W. A. H. Smith, to Record Office, Ruislip, 26.7.38.

Owing to the greatly increased length of these lists as a result of R.A.F. expansion ranks are confined to those of Flight Lieutenant and above.



EVOLUTION: Developed from the Amiot 370, holder of several world's speed-with-load records, the Amiot 340 bomber has been ordered in large numbers for the French Air Force. The prototype 370 had liquid-cooled Hispano 127 engines giving a maximum speed of 305 m.p.h. at 16,400ft. The 340 bomber has more powerful two-row Gnome-Rhone radials. On the record machine the pilot looked forward through the transparent nose portion, the fuselage form being uninterrupted, but in the production bomber a projecting cockpit enclosure is fitted. The span is 75ft. 6in.



ON CHESIL BANK RANGES

Auxiliary Air Force Squadrons at Armament Training

(FROM A CORRESPONDENT)

THREE Auxiliary Air Force Squadrons descended on No. 6 Armament Training Station, Warmwell, in Dorset, for their annual training camps during the first two weeks in August. Here they had the opportunity of carrying out an intensive course of armament training in most suitable conditions.

Normally, A.A.F. squadrons are attached to R.A.F. stations near the coast for their annual period of training, and they are usually allotted two or three days on the nearest ranges for their armament training. At Warmwell this year the three squadrons were on the Chesil Bank ranges every day, and they managed to get through a great deal of work in the way of bombing and also air-to-air and air-to-ground firing.

The squadrons in camp during the past fortnight were No. 504 (County of Nottingham) (Bomber) Squadron, commanded by Squadron Leader Sir Hugh Seely, Bart., M.P.; No. 605 (County of Warwick) (Bomber) Squadron, commanded by Squadron Leader Lord Willoughby de Broke, M.P., and No. 607 (County of Durham) (Fighter) Squadron, commanded by Squadron Leader the Hon. W. L. Runciman, A.F.C. The two bomber squadrons are equipped with Hinds, and No. 607 with Demons. More than 50 machines were brought to camp, these including training types, and there were nearly 600 Auxiliary officers and airmen. Some of them were in quarters, but the majority were accommodated under canvas.

Warmwell (it used to be called Woodsford), which is under the command of Wing Commander W. H. Poole, A.F.C., M.M., is a most suitable A.T.S. for an Auxiliary Air Force camp. Not only is it in one of the pleasantest parts of England, but it is within easy reach of the sea—an almost essential factor for what is, in effect, the main annual holiday of a large number of the A.A.F. personnel. The ranges at Chesil Bank, some ten miles from the station, are ideal for armament training. With ground targets on the bank and bombing targets out to sea, it is possible to carry out bombing and firing simultaneously.

Naturally, with three squadrons clamouring for the use of the ranges, the safety officers and range staff were kept hard at work, usually from 06.00 hours to 18.00 hours.

Each squadron was allotted certain definite periods for the various practices, and, with the assistance of despatching officers, the programmes had to be adhered to to the minute. In view of the fact that most of the pilots and air gunners had not been previously to an armament training camp, some creditable scores were recorded. More than 50 per cent. for the air-to-ground and drogue firing was obtained several times, though nobody could compete with the 100 per cent. ground target score recently put up by an F.T.S. instructor there. One pilot in his zeal actually flew into the drogue; but, although he "divorced" it from the towing Wallace, he did no other damage. In the bombing several crews obtained average errors of less than 100 yards from 6,000ft. Incidentally, the swans of Abbotsbury at the north-west end of the ranges do not seem to be affected in the least by all the zooms and bangs. At certain times of year, in fact, they are said to frequent the targets—perhaps they think it is the safest place!

The elementary training of pilots continued throughout the camp, and, when the squadrons were not on the ranges, other exercises such as formation, photography, wireless telegraphy, battle climbs and cross-country flights were practised. With the large number of flying hours put in the airmen had plenty of opportunity to gain proficiency in their trades during the routine inspections of the machines.

During the second week the Air Minister flew to Warmwell and paid an informal visit to the camp. He lunched in the mess and saw the squadrons at work. Another distinguished visitor was the Under-Secretary of State for Air, Captain Harold Balfour, M.P.

As the three squadrons left Warmwell at the end of their fortnight they were replaced by two more A.A.F. squadrons, and a third A.A.F. squadron is expected there at the end of the month.

TWIN-TAILS REVIVED?

An Interesting French Project

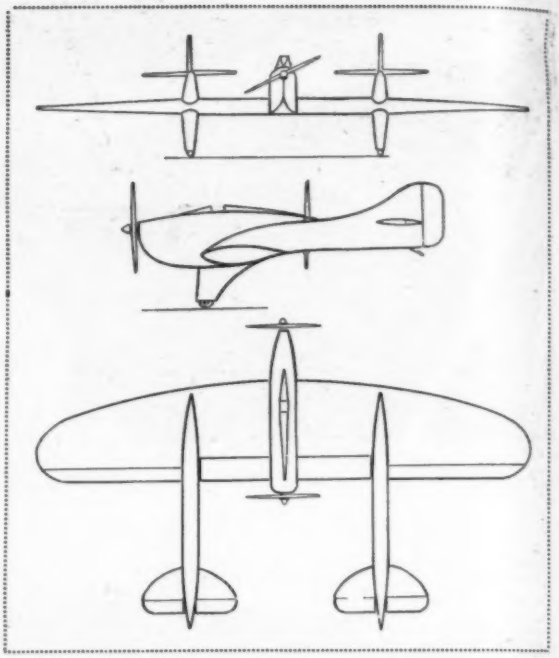
THE French aircraft designer, Edouard Albert, who achieved considerable success with some fast light planes many years ago, submitted to the Air Ministry a sketch design for a twin-engined, twin-fuselage military fighter aeroplane. This was a couple of years ago, but at that time the French Air Ministry could not see their way to adopting the suggestion, and as M. Albert had not the necessary finance to build the machine nothing more was heard of the project. Now, however, M. Albert has described the idea in our contemporary, *Les Ailes*.

The design is shown in the three-view general-arrangement sketch, and it will be seen that M. Albert's intention was to place the two engines, of 500 to 550 h.p. each, in tandem, with the crew of one or two between the engines. Another feature of the design was that it had twin fuselages, each carrying a complete tail. The wheels were in trousers, and M. Albert's argument was that as the fuselages could be made of very small cross-section, their drag would be low. The placing of the two engines above the wing would mean that airscrew clearance could be obtained without having a very tall undercarriage, so that it was scarcely necessary to retract it, although this could be done if thought advisable.

From a military point of view, he argued that the crew would be well protected, having the engines in front and behind them, and his idea was that each engine should be provided with a canon. As an attack machine the Albert would be able to use the front canon during the approach to an enemy aircraft, and when that had been overtaken the fighter would turn away and bring its rear gun into action, a mirror sight being provided for the rear gunner. The splitting of the tail would give a clear field of fire for the rear canon.

It was argued that this arrangement of engines and fuselage would give the cleanest possible aeroplane, and with variable-pitch airscrews the machine would be able to continue its flight with either of the two engines stopped, so it should never have to make a forced landing in a small field, as he considered it extremely unlikely that both engines would ever be put out of action by gunfire or any other cause.

M. Albert suggests the use of this type of machine as a dive bomber. He points out that the tandem arrangement of the engines would mean that with a fully feathering airscrew one engine could be used to give an air drag effect during the dive and thus prevent the machine from reaching too high speeds. After releasing the bomb and flattening out, this engine would be throttled down and the other opened up to enable the machine to begin its climb while the second airscrew was being put into forward pitch.



It appears that with the nationalisation of the French aircraft industry, M. Albert has little hope of seeing his project realised, but the suggestion is an interesting one, at any rate.

Russian Stratoliners?

ON the anniversary of their flight from U.S.S.R., via the North Pole, to America, Gromof, Jumashef and Danilin recently published in *Pravda* an article containing the statement that special aircraft for high-altitude work are now in course of construction at the Moscow aircraft works. The type, which has been designed by M. Jumashef, is intended for operation at an altitude of 5-6 miles and is fitted with special de-icing equipment in which particular field sensational inventions are said to have been made in Soviet Russia of late.

A short while ago M. Jumashef made a trial non-stop flight from Moscow to the Ural mountains and back in one of the new machines, which carried a crew of eight at a cruising speed of 215 m.p.h. at 16,500ft. The Soviet Government, it is reported, intends to send the new machine, "type 20B," on a non-stop flight from Moscow to California *and back* before the end of this year. The machine will thus be making a non-stop flight, via the North Pole, of nearly 12,500 miles while flying at a height of 5-6 miles. We shall see what we shall see—but there it is.

In Harness

THE Stinson Reliant which has been privately used by Mr. J. R. Bryans during the last year or so is now seriously available for charter work since Mr. Bryans has obtained himself a "B" licence.

This machine was previously one of the three most completely equipped privately owned aeroplanes in the country, and now, as a charter conveyance, this equipment should be put to its best use. Two-way radio may eventually be installed in place of the simple direction-finding receiver with which it is at present fitted, and when necessary Mr. Bryans will then carry a radio operator, while still leaving sufficient payload to carry two passengers and their luggage. The standard rate for the machine is 1s. 6d. per mile—which, as an example, means that it costs £80 for three people to hire the machine and fly to Zurich.

Cunliffe-Owen Expansion

WORK began last week on the erection of a new factory for Cunliffe-Owen Aircraft at Southampton Airport. It will cost £150,000. It is hoped that part of the new factory will be ready for use in three months' time, and that the whole building will be completed within six months.

Work has been proceeding for some time in present factory at Southampton Airport on the construction of the first Burnelli monoplane to be made in this country, and it is expected to be ready for trial flights within the next month. This machine, which is generally similar to the American version, will be fitted with Bristol Perseus sleeve-valve engines. According to a statement made by the company recently, they are thinking in terms of very much larger machines.

The factory will occupy the area between Wide Lane and the new Vicker-Supermarine works. In the circumstances it is probable that extensions will be made to the landing area.

Speeding Up Production

A SUCCESSFUL works conveyor system must be composed of standard parts that are flexible enough to be adapted to any requirements. It is claimed that this flexibility is possessed in a high degree by the Webb conveyor system which is manufactured in this country by Fraser and Chalmers Engineering Works, the proprietors of which are the General Electric Company, Ltd.

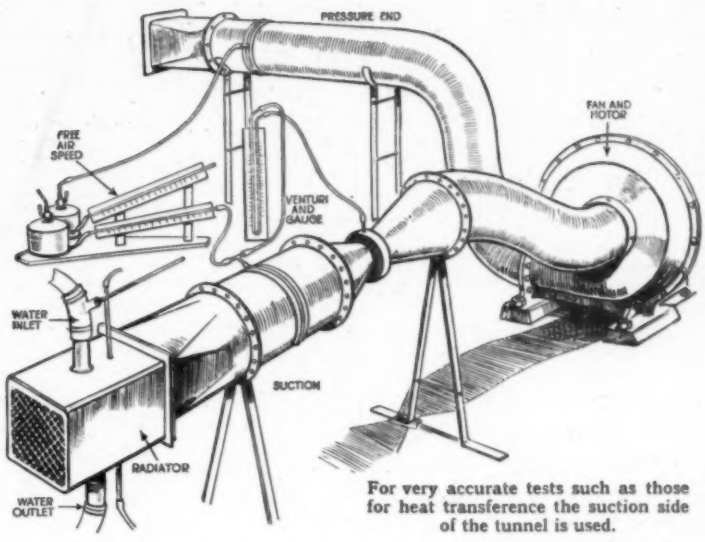
The system is described in detail in publication F. and C. 8336, obtainable on application to Fraser and Chalmers Engineering Works, Erith, Kent, or to the General Electric Co., Ltd., Kingsway, London, W.C.2.

Flight Index

THE index to the January-June, 1938, volume of *Flight* is now available and is obtainable at 7d., including postage, from The Flight Publishing Co., Ltd., Dorset House, Stamford Street, London, S.E.1.

Binding cases are also available and are supplied, together with the Index, at 4s. 4d., postage included.

TESTING COOLERS and HEATERS



For very accurate tests such as those for heat transference the suction side of the tunnel is used.

ALTHOUGH a fairly limited number of engine types power military and civil machines, almost every designer has his own ideas as to the position and shape of radiator to be used, whether for oil, coolant, or a combination of both. Again, the operational speed and height of the aircraft have a big influence on radiator design. It is apparent, for these reasons alone, that every new aircraft means a new problem for the manufacturer of the radiator or radiators.

Much the same may be said of cabin heater design, though in this case for the reasons that cabins vary so much in size, that they are designed in the first place for either comfort or utility, that an engine in the nose generally gives a warmer cockpit than engines in the wings and finally that operational altitudes and, therefore, outside temperatures vary considerably.

So far it has been almost impossible to design and fit successful heating or cooling equipment to a new aircraft solely from figures given by the manufacturer, and many hours are generally spent in flight testing. Conversely a new design of radiator must be extensively tested under flight conditions.

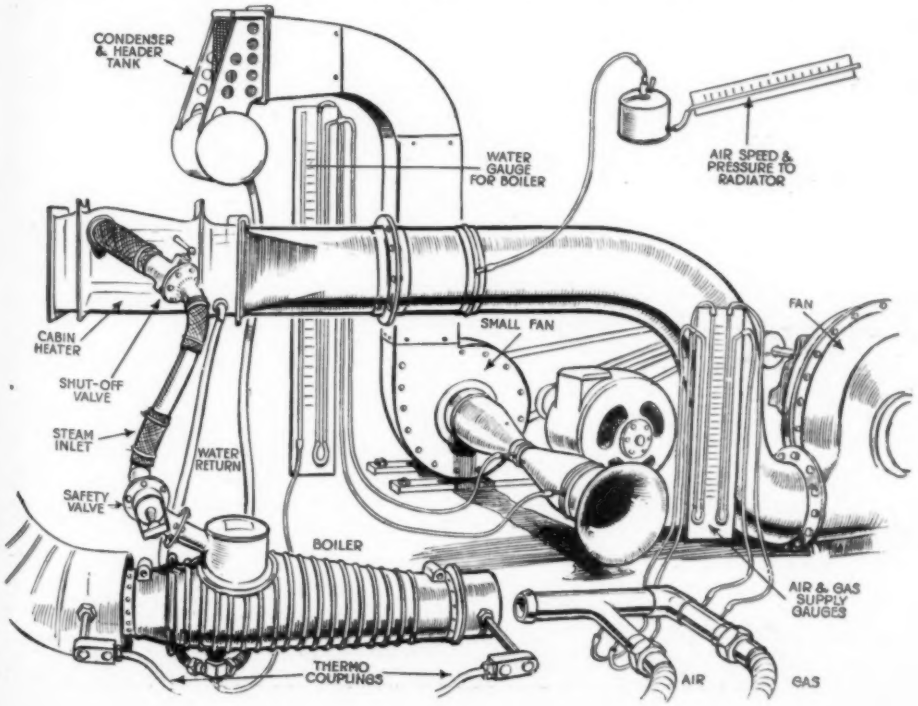
All these considerations led the firm of Gallay, Ltd., makers of radiators and heaters for all types of aircraft, to devise a wind-tunnel testing plant for their products which would enable a good deal of the development and test work to be completed in the works, thus saving both time and money.

A large blower giving a maximum wind speed of 150 m.p.h. is used for testing radiators and heaters. For very accurate work the suction end of the tunnel is used, where the air flow is smoother. Under this heading come heat-transference tests for new radiator blocks or oil coolers, or pressure-drop tests through radiator elements.

A hot-water circulation used in conjunction with the heat transference tests is capable of producing 8,000 B.T.U./min. The maximum flow, which is automatically maintained constant, is 50 gal./min. A similar system for oil coolers circulates 800 gal./hr. and produces 1,800 B.T.U./min.

Experiments reach a considerable degree of accuracy. Temperatures are measured to 0.2 deg. C., while air volumes and speeds in the tunnel are measured by a venturi, giving about 15 times greater pressure difference than a pitot tube. The difference of air speed through the cross section of the tunnel has been shown not to exceed 2 per cent. An inclined water gauge, used in conjunction with the venturi, permits differences of pressure in the tunnel of a few hundredths of an inch, to be observed.

The testing of cabin heaters necessitates the use of two fans, the larger for air supply to the heater and the



A layout for testing a cabin heater and its units. The boiler is designed to fit round a large exhaust pipe, but a controlled and measured coal gas flame is used to reproduce exhaust heat for the test.

smaller, which gives up to 1,200 cu. ft./min. of air, for the condenser. In the place of exhaust gases through the boiler, which is in the form of a jacket, a large gas jet supplies up to 10,000 B.T.U./min. and reaches about 900 deg. C. Two venturi meters control the gas and air flow. The layout for this test is shown in the larger drawing.

Cabin heaters and oil coolers are tested as complete units, but main coolant radiators, which are much larger, are scaled down, a fraction of the whole element being used.

Two other testing installations to meet A.I.D. requirements, check water and oil flow through the respective radiators under a constant head of 7ft. A maximum water flow of 250 gal./min. and a maximum oil flow of over 25 gal./min. can be obtained.

The firm are willing to place their testing equipment at the disposal of aircraft manufacturers.

THE INDUSTRY

Scottish Invitation

VISITORS to Glasgow who are interested in machine tool equipment should take advantage of an invitation to visit a demonstration, which is being held daily until August 27th, of various types of machine tools at the Glasgow showrooms of George H. Alexander Machinery, Ltd., at Woodville Street, Glasgow. The demonstration will include a Raboma Radial Drilling Machine Model 12 TL.800, the Deckel Universal Milling Machine FP-1, the Deckel Relief Engraving and Die-sinking Machine GK-2, Deckel Engravers, the Do-All Contour machine, the Radiac Abrasive Cut-off machine, the Rockwell Hardness Tester, the Erichsen Tester, and a number of high-class small tools. Intending visitors are requested to notify George H. Alexander Machinery, Ltd., at Coleshill Street, Birmingham, 4, of the date and time of their proposed visit.

Regarded by many as one of the more brilliant of the younger scientists of the day, Dr. Colin J. Smithells, D.Sc., has recently accepted an appointment with Lodge Plugs Ltd. as general manager. Chiefly interested in the application of physical chemistry and metallurgy to the electrical industry, he has been with the General Electric Co. since the inauguration of its research laboratories in 1919.

On the Shelf

A RECENT leaflet issued by Constructors, Ltd., of Tyburn Road, Erdington, Birmingham, who are specialists in steel storage equipment, deals with "A.R.P. shelving"—in other words, storage equipment for gas-mask distributing depots.

Head, Wrightson & Co., Ltd.

MR. L. J. MOGRIDGE has been appointed the manager of the new branch office recently opened at Central House, 75, New Street, Birmingham, by Head, Wrightson and Co., Ltd., of Thornaby-on-Tees. The new office has been opened owing to an increasing demand for practical co-operation on engineering problems.

Hand Protection

KNOWN as "Sternocleanse," a new preparation is designed for application to the hands before work is commenced. Rubbed in, it forms a thin but impenetrable layer to prevent cutaneous absorption of acids, alkalis, greases, paints, cellulose, or other substances which may sometimes be a basic cause of skin diseases such as dermatitis. After work it can be washed off instantly with soap and water, taking with it stains and dirt which would otherwise have entered the pores.

Full details and samples can be obtained by application on business paper heading from the makers, Sternol, Ltd., Royal London House, Finsbury Square, London, E.C.2.

Short Bros.' New Capital

SHAREHOLDERS of Short Brothers (Rochester and Bedford) recently sanctioned the creation of 250,000 5 per cent. Redeemable Cumulative Preference shares of £1 each. These were offered at par, together with 50,000 5s. Ordinary shares at 27s. 6d. per share.

Light in the A.R.P. Darkness

EMERGENCY lighting equipment plays an important part in A.R.P. schemes, especially where industry is concerned. Petters, Ltd., of Yeovil, announce that they have arranged to place their long experience in this direction at the disposal of public authorities and private business concerns. Advisory service is offered free and without obligation.

PUBLICATIONS RECEIVED

Report on the Royal Scottish Museum, Edinburgh, for the Year 1937; 3d., H.M. Stationery Office, Adastral House, Kingsway, London, W.C.2.

The Morris Triple Gear Pulley-Block; Herbert Morris Ltd., Loughborough.

The Royal Air Force and the Air Forces of the British Empire Year Book 1938; 5s.; Gale and Polden Ltd., Aldershot.

L'Annuaire de l'Aviation Yougoslave, 1938; Zorèza Klemansoa 37/11, Belgrade.

Journal of the Institute of Fuel: Heat-Resisting Steels, by Dr. W. H. Hatfield; Firth-Vickers Stainless Steels Ltd., Staybrite Works, Sheffield.

Metal Airplane Structures, by Maj. Flavius Loudy; 24s., Constable and Co., Ltd., 10, Orange Street, London, W.C.2.

International Labour Conference Report V: Generalisation of the Reduction of Hours of Work. Part II: Transport; Section B, Inland Water Transport; Section C, Air Transport; 2s., 12, Victoria Street, London, S.W.1.

Concerning Callender's, No. 6; Callender's Cable and Construction Co., Ltd., Hamilton House, Victoria Embankment, London, E.C.4.

Stratosphere and Rocket Flight (Astronautics), by C. G. Philp (Third Edition); 3s. 6d., Sir Isaac Pitman and Sons, Ltd.

Metal Aircraft for the Mechanic, by J. Healey; 5s., Sir Isaac Pitman and Sons, Ltd., Parker Street, Kingsway, London, W.C.2.

Airplane Structures, by A. S. Niles and J. S. Newell; Vol. II, 2nd edition; 13s. 6d., Chapman and Hall, Ltd., 11, Henrietta Street, Covent Garden, London, W.C.2.

History of No. 56 *Squadron*, 1916–1922.

Harbord's Glossary of Navigation, 4th edition, enlarged; 12s. 6d., Brown, Son and Ferguson, Ltd., 52–58, Darnley Street, Glasgow, S.1.

The Air and its Mysteries, by C. M. Botley; 8s. 6d., G. Bell and Sons, Ltd., York House, Portugal Street, London, W.C.2.

The Clouds Remember, by Leonard Bridgman; 10s. 6d., Gale and Polden, Ltd., Argyll Street, London, W.1.

A.M. Fuel Systems for Aircraft, by Basile Demtchenko, Ph.D.; 90 fr., Gauthier-Villars, 55, Quai des Grands-Augustins, Paris, France.

Aero Engines and their Lubrication. Free to the Industry from C. C. Wakefield and Co., Ltd., Wakefield House, Cheapside, London, E.C.2; 2s. to the public.

Even Further Pobottle, Vol. No. VI. High Duty Alloys, Ltd., Slough, Bucks.

Payen 1938 *Gasket Guide*. J. Payen, Ltd., Church Street, Chiswick, London, W.4.

NEW COMPANIES

In the notes below, for reasons of space, the "objects" of new companies are usually somewhat abbreviated.

JIG & TOOL (COVENTRY) LTD.—Private company, registered July 27. Capital, £1,000 in 1,000 shares of £1 each. Objects: To make and deal in all kinds of machine and other tools, jigs, apparatus, machinery, engines, motors, aeroplanes, etc. The directors are: Albert H. Birch and Sidney W. Turner. Registered office: 111, Harnall Lane East, Coventry.

CHRONANDER WADDINGTON AIRCRAFT, LTD.—Private company, registered August 6. Capital, £14,000 in 12,800 ordinary and 1,200 deferred shares of £1. Objects: To acquire the business of aeronautical engineers and aeronautical plant and tool makers carried on by Carl R. Chronander and James I. Waddington at Oxford Avenue, Trading Estate, Slough, Bucks. The directors are: Carl R. Chronander, James I. Waddington. Registered office: 10, Oxford Avenue, Slough, Bucks.

ISLE OF WIGHT AIRWAYS, LTD.—Private company, registered August 4. Capital, £100 in 100 shares of £1 each. Objects: To establish, maintain, work, operate and carry on air services, etc. The directors are: Percival F. Cansdale, C.A., Basil C. Cocks. Registered office: 26-7, King Street, London, E.C.2.

INCREASES OF CAPITAL

HANDLEY PAGE, LTD. (Cricklewood).—The nominal capital has been increased by the addition of £124,465 beyond the registered capital of £448,074. The additional capital is divided into 497,860 ordinary shares of 5s. each (to be subsequently converted into ordinary stock).

SHORT BROTHERS (ROCHESTER & BEDFORD) LTD.—The nominal capital has been increased by the addition of £250,000 beyond the registered capital of £250,000. The additional capital is divided into 250,000 redeemable 5 per cent. cumulative preference shares of £1 each.

PHILLIPS & POWIS AIRCRAFT, LTD. (Woodley, Reading).—The nominal capital has been increased by the addition of £50,000 beyond the registered capital of £250,000. The additional capital is divided into 200,000 ordinary shares of 5s. each.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

(*Published August* 18, 1938)

17251. NISBET, R. H., and SPERRY GYROSCOPE CO., LTD.: Servo-motor systems for effecting position control (489,271).

34237. SPERRY GYROSCOPE CO., INC.: Direction-finding, particularly for aircraft (489,032).

1639. TISDELL, T. A., and AMAL, LTD.: Air-filters (489,109).

1759. PHILLIPS, A. C., and KAPELLA, LTD.: Aircraft instruments (489,232).

1954. BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE CO.: Fluid pressure mechanisms (489,288).

1989. TONDEUR, R.: Device for use in aerial warfare (489,294).

2001. BRISTOL AEROPLANE CO., LTD., and FEDDEN, A. H. R.: Means for eliminating vibration in internal combustion engine crankshafts and the like (489,337).

10811. AEROPLANI CAPRONI SOC. ANON: Means for controlling guns fitted upon aircraft (489,059).

25631. MERCIER, P. E.: Air-cooling of the cylinders of internal-combustion engines on aircraft (489,076).

26874. DEGEA AKT.-GES. (AUERGES): Warning systems for moving objects, particularly for use in the dark in the event of air attacks (489,140).

34437. LABILLIERE, F. C. D. DE, and MACLAVERTY, E. J. V.: Apparatus for ventilating railroad and road vehicles, aircraft, ships, and the like (489,085).